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CONTENTS.

Original Communications.

PAGE

Prophylactic Hygiene. By Professor Dujardin-Beaumetz..... 361
Spinal Localization in its Practical Relations. By Charles K. Mills, M.D... 369
Antifebrin in the Treatment of Epilepsy. By Theodore Diller, M.D..... 383
Viburnum Prunifolium as a Test for Labor-Pains. By R. L. Hinton, M.D. 385
Poisoning by Hyoscine Hydrobromate. By D. W. Prentiss, M.D..... 386
Note on the Dose of Iron. By W. W. Jaggard, M.D..... 386
A Case of Spontaneous Combustion in Man. By Floyd Clendenen, M.D..... 387
Additional Note on the Treatment of Yellow Fever. By George M. Sternberg, Surgeon U.S.A..... 388

Leading Articles.

Thoughts on Uric Acid..... 390
Salicylate of Mercury in Syphilis..... 391
Deventer's Method of delivering the After-coming Head..... 392
Antipyrin in Diabetes..... 394
Simulo as a Remedy in Epilepsy..... 396
Pyrodin and Hydracetin..... 396
Freezing of the Surface in Neuralgia..... 397
Inhalations of Chloroform in Diseases of the Lungs and Heart..... 398
Liability to Damages from Defective Drainage..... 399

Reports on Therapeutic Progress.

PAGE

On the Treatment of Whooping-Cough by Antipyrin..... 389
The Place of Electricity in Therapeutics..... 399
Suspension in the Treatment of Progressive Locomotor Ataxy..... 401
Sulphonal in Night-Sweats..... 402
The Action of Sulphonal in Insanity..... 403
The Treatment of Burns produced through Sulphuric Acid..... 403
The Treatment of Acne without Arsenic, Sulphur, Ointments, or Lotions..... 404
The Purgative Effects of Glycerin Enemata and Suppositories..... 404
The Use of Menthol in Asthma..... 405
The Treatment of Whooping-Cough..... 405
Sulphate of Calcium as a Remedy for Infantile Convulsions..... 406
The Use of Solvents in Cases of Renal Calculus..... 406
The Use of Sulphur in Various Disorders of the Alimentary Canal and Liver..... 408
The Use of Glycerin Enemata and Suppositories..... 409
The Use of Rectified Oil of Turpentine in Croup..... 410
The Comparative Value of the Different Methods of treating Acute Gonorrhœa 411
Treatment of Rheumatism..... 412
Nettle-Juice in the Treatment of Hepatic Colic..... 412
A Diagnostic Sign of Typhoid Fever..... 413

PAGE

Perchloride of Mercury and Cannabis Indica in Dysentery..... 414
The Emetic Properties of the Meadow Daffodil and the Bark of the Elder-Tree..... 414
Bromide of Potassium in Ovarian Acne 414
The Action of Morphine on the Uterus 415
The Movements of Respiration..... 415
The Physiological Properties of the Anilides..... 416
Heart Complications in Gonorrhœa..... 417
Bromide of Sodium in Intolerance for Quinine..... 417

Reviews..... 418

Correspondence.

Paris Letter..... 421
Berlin Letter..... 424
Iodism and Syphilis..... 426
Poisoning with Calla Lily..... 427
Hemorrhage from Salicylic Acid..... 427
Treatment of Yellow Fever..... 428
Treatment of Phthisis..... 429
Hypodermic Injection of Lactate of Quinine..... 429
The Dose of Gelsemium Sempervirens.. 429

Notes and Queries.

Tuberculosis of the Peritoneum..... 430
The Identification of Certain New Remedies..... 430
Circular to the Medical Profession..... 431
"Procursive" Epilepsy..... 432
The Treatment of Aneurisms..... 432
Cinchonidine and Epilepsy..... 432

Original Communications.

PROPHYLACTIC HYGIENE.

LECTURE X.—ON PROPHYLAXIS BY ALIMENTATION.*

BY PROFESSOR DUJARDIN-BEAUMETZ, PARIS, FRANCE.†

GENTLEMEN:—In previous lectures we have seen how man may preserve himself from infectious diseases by disinfection, isolation, vaccinations. It remains now to show that it is also in our power by a discriminating choice of the alimentary substances, which constitute our daily fare, to oppose in large measure the poisonings, infections, or toxi-infections to which we are exposed. This will be the subject of this lecture.

Foods may be the conveyers of a certain number of diseases, some eminently infectious and virulent, like typhoid fever and tuberculosis; others belonging to the group of parasitic affections, such as tænia and hydatid cysts; there are still others which are of a toxic character, and result from the presence of poisonous ptomaïnes. Lastly, we are able in cases of self-poisoning (auto-intoxication), resulting from insufficiency of the divers

* Advance sheets of a lecture delivered in Cochin Hospital, and translated for this journal by E. P. Hurd, M.D.

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emunctories of the economy, by a special hygiene to diminish the dangers and retard the development of toxæmia. These are the points which I shall examine successively in this lecture.

But before taking up this subject, I desire, as briefly as possible, to point out the *rôle* which micro-organisms play in digestion. Already, in previous lectures, I have examined the bases of intestinal antisepsis, and have shown you the incessant production of toxines throughout the entire extent of the digestive tube, and their elimination by the urine and fæcal matters.

I have also told you that certain states of the digestive tube, and in particular dilatation of the stomach, or even constipation, favor the formation of these toxines and their penetration into the economy, and we are warranted in attributing to this kind of poisoning an important part in the phenomena, so strange and multiple, which characterize gastrectasis.

I have told you, moreover, that gastric embarrassment (ordinary "biliousness," acute gastro-intestinal catarrh) may be the effect of these poisonings, and that its treatment consists in neutralizing and expelling the toxines which have been introduced into the digestive tube, or which have formed there. I shall not return to these points which have been brought out in the previous lectures. But I desire to-day to call your attention to the favorable *rôle* of certain micro-organisms in the act of digestion.

Remark, first, that the buccal cavity contains a great number of microbes, some harmless or even beneficial, others harmful; and in a work published by Vignal this writer states that he has found in the mouth seventeen species of micro-organisms which act upon alimentary substances; some dissolve albumen, others gluten, others casein; certain of them transform starch into sugar, others invert cane-sugar.

Moreover, what takes place in the mouth also takes place throughout the entire extent of the digestive tube, and there are microbes which secrete diastases belonging to the same category as the other ferments; and just as the yeast-plant secretes sucrose, we see certain micro-organisms liquefy and peptonize albumen. Thus, the anthracoid bacterium, the vibrio of septicæmia, dissolve and liquefy gelatin, so that these microbes, which are so dangerous when introduced under the skin, might possibly play a useful part in digestion.

As Duclaux has well said, we may affirm that the good functionment of the digestive tube results from the equilibrium which exists between the regular secretion of the digestive ferments and the work of the micro-organisms. This equilibrium, it must be remembered, is often broken, for it may happen that the micro-organisms shall predominate, and this because they are not destroyed by the gastric juice, which has lost its acidity, or because too large a quantity has been introduced, or, it may be, because the residues of digestion, which contain them in abundance, have not been eliminated from the economy.

In other cases it is just the reverse which happens. There are not microbes enough, and there is an exaggerated production of digestive ferments. This is what happens in that special state which Professor Sée has described under the name of *hyperchlorhydria*. The exaggeration of the acidity of the gastric juice destroys the micro-organisms, and in this way disturbs the functions of the digestive tube and arrests digestion.

Let the equilibrium be broken by increase of microbes or increase of (chemical) ferments, and there results a symptomatic aggregate—a real systemic poisoning, of which gastric embarrassment (*embarras gastrique*) and hepatic congestions are the most frequent manifestations.

Do not forget the important *rôle* which the liver has in this penetration of the economy by the toxines produced on the surface of the intestinal tube. A gland, one of whose offices is the destruction of baneful alkaloids, the liver constitutes a real barrier against the entrance of these toxines into the general circulation, but their presence none the less determines a local irritation of the liver, which manifests itself by a congestion of that organ.

Duclaux rightly insists on the importance of certain fermented articles of diet as a part of the daily fare, basing himself on the utility of these micro-organisms in forwarding digestion. These fermented products bring with them their contingent of micro-organisms and of ferments to aid the digestive process. Examine the dietary of all nations, and you will always find certain products of fermentation included among their foods; hence the long recognized utility, from a digestive point of view, of old cheese, and sour-crout, always admitted to be more digestible than plain cabbage.

But if there are micro-organisms that are beneficial, there are others that are harmful,

and, as I have spoken of the buccal cavity, I must tell you that a great number of dental affections, and, in particular, dental caries, are of parasitic origin. The researches of Miller, of Berlin, and especially those of Galippe and Vignal, are in this respect absolutely demonstrative.* The latter writers have described six varieties of micro-organisms, all of which cause dental caries. This is not all. It is probable that a certain number of infectious diseases, as certain pneumonias, may result from the penetration of the air-passages by particular pathogenic micro-organisms sojourning in the buccal cavity.

Hence, from the point of view of prophylactic hygiene, we should insist more than ever on the necessity of buccal hygiene, and on the usage of antiseptic dentifrices. Among the various mouth-washes I am inclined to give preference to the following formula:

Phenic acid, 1 (gr. xv);
Boric acid, 25 (ʒvi¼);
Thymol, .50 (gr. viiss);
Essence of peppermint, gtt. xx;
Tincture of anise, 10 (ʒiiss);
Water, 1 litre (Oii). M.

Rinse the mouth, and brush the teeth with a little water containing an equal quantity of this solution, and do this once or twice a day after meals.

It would be a good plan if in our schools and in the army it should be made obligatory on pupils and soldiers to take the same pains in maintaining cleanliness of the mouth as of the hands and face.

I pass now to the main part of my subject,—namely, to the *rôle* which is played by alimentation in the propagation of certain diseases, and, in particular, of tuberculosis and typhoid fever.

Since the time that Villemin experimentally proved that tuberculosis is a virulent disease, contagious, and transmissible, and since Koch showed us the very contagious principle by his discovery of the tubercle bacillus, the attention of hygienists has been directed to the subject of the possibility of the transmission of tuberculosis by the use, as food, of the meat and milk of tuberculous animals. Let us examine separately each one of these points; first, that of meat; second, that of milk.

In the recent Congress for the Study of Tuberculosis, held in 1888, under the presidency of Chauveau, this question was long and keenly discussed, and I would refer those who desire a more intimate knowledge of the subject to the volume recently published concerning full reports of the proceedings.† The Congress adopted the following proposition formulated by Butel: "There is reason for the enforcement by all possible means of the general principle of the seizure and total destruction of all meats whose source is tuberculous animals, whatever may be the gravity of the specific lesions found in those animals."

The French government has given its sanction to this conclusion, for, by a decree bearing date July 29, 1888, it has placed tuberculosis among the diseases which come under the law of July 21, 1881, which regulates the sanitary police of animals.

To-day, then, the sanitary provisions of this law, applicable to tuberculous animals, are the following: The declaration of the animal as tuberculous, its isolation, the inspection of the sick animal by the veterinary appointed for the purpose, the exclusion of the meat from consumption if the tuberculous lesions are generalized; lastly, the interdiction of the milk of the diseased animals from consumption by man, although it is allowable to use the milk if it has been previously boiled.

Have we as yet a positive demonstration of the possibility of the propagation of tuberculosis by the flesh of diseased animals? Experiments in this regard are rather contradictory. While Nocard, on practising intraperitoneal injections in twenty-one series of guinea-pigs with the juice of the meat of twenty-one cows manifestly tuberculous, has obtained but one successful inoculation, Chauveau and Arloing, in two series, have had one positive result; and Saltier, out of twenty-one series, five positive results. Hence, while Arloing insists on the danger of tuberculous meat, and the frequency of the propagation of disease thereby, Nocard considers the fact as absolutely exceptional.

I am disposed to adopt the latter view. In fact, in the observations to which I have referred, the juice of the meat is introduced directly into the peritoneum, without having undergone the destructive action of the gastric juice and of the intestinal digestion. Moreover, this meat had not been previously cooked, so that the experiments in no way

* Gallippe and Vignal, "Note on the Micro-organisms of Dental Caries" (*Gaz. des Hôp.*, April 2, 1889, p. 365).

† "Congrès pour l'Étude de la Tuberculose chez l'Homme et les Animaux, Première Session, 1888." Paris, 1889.

realized the conditions fulfilled in the ordinary dietetic use of meat.

The experiments of Peuch, of Toulouse, come nearer the reality. He gave to two pigs, aged two months and a half, five kilogrammes of raw meat apiece, the source of this meat being a cow known to have died of tuberculosis. He killed one of these pigs two months and a half afterwards, and found a few tubercle granules in a mesenteric gland. The other animal, killed three months afterwards, was exempt from any advanced tuberculous lesions; there were a very few tubercle granulations in the mesentery; all the other parts of the body were healthy.

Add that tuberculosis is much less frequent in animals than one would suppose. Since the application of the decree of July 31, 1888, to the slaughtering-houses of Paris,—*i.e.*, from the 1st of August to the 31st of December, 1888,—there entered the *abattoirs* twenty-four thousand seven hundred and twenty-four cows. (I specify cows, for these animals furnish not only their meat but also their milk, and I shall have to refer to these figures again when I come to speak of the transmission of tuberculosis by milk.) Out of these twenty-four thousand seven hundred and twenty-four cows, there were found one hundred and thirty-five cases of tuberculosis, which represents a proportion of .5 per cent.

Hence, then, by reason of the rareness of tuberculosis in animals and the destructive action of the gastric and intestinal digestion; lastly, owing to the preparation to which we subject our meat before eating it,—we reduce to the minimum the possibility of contagion, and the transmission of tuberculosis in this way becomes a very exceptional circumstance.

I may say the same of the transmission by milk, and although Legroux has affirmed that unboiled milk is frequently the cause of tuberculosis in children, I persist in considering this occurrence as extremely rare, and for the following reasons:

First, in order that milk may contain Koch's bacilli, the animal must not only be tuberculous, but it must have tuberculous lesions of the udder,—it must have tuberculous mammitis. Moreover, we must take into consideration the destructive action of the gastric juice on Koch's bacillus; lastly, the rarity of tuberculous cows.

You know that the name *pommelière* (bovine consumption) has been applied to tuberculosis of the cow; it has been affirmed that in the cow-stables of Paris, which are so numerous and often so badly managed, this disease is very frequent. Now, if we refer to the figures given by Alexandre, inspector of the markets, we shall see that there scarcely exist in all the stables of the Department of the Seine twelve cows affected with *pommelière**, and you should add, what is of capital importance, that the presence of tuberculosis in the cow is not enough to cause tuberculous milk, the udder must be tuberculous. These animals command a high market price, a good milch cow being worth six hundred francs (one hundred and twenty dollars), hence the owners have every interest in keeping only sound animals. Without, then, denying the possibility of transmission of tuberculosis by milk, we must consider it as extraordinarily rare. Moreover, there is a very simple way of avoiding infection,—namely, by boiling the milk, or by using the milk of the goat or the ass, animals rarely tuberculous.

But if there is a disease in which alimentary hygiene plays a preponderant *rôle* from the point of view of prophylaxis, this disease is surely typhoid fever.

Typhoid fever is one of the diseases which make the most havoc among our populations, and, to convince you of this, I need only refer you to the figures of Brouardel, presented a short time ago, and which show that every year typhoid fever carries off twenty thousand of our people. Such statistics are the more significant when we endeavor to estimate the prevalence of typhoid in the army, where it makes the greatest ravages.

From 1872 to 1884, the French army, which has numbered during these years five million three hundred and seventy-five thousand six hundred and nine soldiers, enlisted for a longer or shorter term of service, has lost by disease or by accident fifty-five thousand one hundred and eighty-nine, and one-third of this whole mortality was produced by typhoid fever. There were, in fact, one hundred and fifty-one thousand three hundred and nineteen cases of this disease in the army, with a mortality of seventeen thousand six hundred and fifty-two. In view of such facts, you understand the interest which attends this great question of preservation from typhoid fever by a correct alimentary hygiene.

For a long time medical authorities have attributed to water contaminated by typhoid dejections a preponderant *rôle* in the development of this disease, and this before microbiological studies had made known the pres-

* Alexandre, "Report to the Prefect of Police on the Contagious Diseases of Animals observed in 1888." Paris, 1889.

ence of the *bacillus typhosus* in the water and in the dejections. Here clinical observation had long gone ahead of bacteriological researches; but it must be admitted that the latter have given indisputable scientific confirmation to the doctrine of the communication of typhoid fever by drinking-water.

Leaving on one side all the works which have been called forth by the fæcal theories of typhoid fever, and the memorable discussions which arose between Murchison and Budd on this very subject in 1874 and 1875, and all that has been said as to the contagiousness of typhoid fever, I shall dwell only on the recent points which this question of contagion has raised.

It had long seemed demonstrated that the contamination of potable waters by the dejections of individuals affected with typhoid fever was one of the powerful causes of the contagion of this disease, and the reports on epidemics sent each year to the Academy of Medicine contained facts confirmative of this doctrine. I will mention particularly the reports of Lardier, of Rambervillers, which show us in the Vosges typhoid fever disappearing in certain cities when the population drank water from sources which had not been contaminated.

I will mention particularly the very precise observation of Dionis, of Carrières, pertaining to a fact which took place at Auxerre. A water-source from which a large part of the inhabitants of the city derived their supply became polluted by the dejections of a typhoid patient, and an extremely fatal epidemic broke out among those portions of the population which made use of this water.

I will also mention the city of Vienna, in Austria, where typhoid fever has almost disappeared since the inhabitants have abandoned all other kinds of water for drinking purposes but pure spring water. There are abundance of facts of this kind.

But it is to Chantemesse that we owe the experimental proof of the presence of Eberth's bacillus in contaminated waters. I need not remind you of the painful circumstances under which these researches were made. You all remember the instance of that family which was swept away by typhoid fever after making use of water from a well of Pierrefonds in which the fæcal matters of some typhoid patients had been emptied. On examining this water, Chantemesse found there the presence of the *bacillus typhosus*. Since then this question has been taken up from another point of view, and in a work undertaken by Grancher and Deschamps* these experimenters have endeavored to ascertain what becomes of the *bacillus typhosus* when the dejections of dothinenteric patients are thrown upon the soil. They have shown that the bacillus does not filter through the soil, and that it is arrested at forty to fifty centimetres of depth, and that there it may sojourn and develop so that five months afterwards it may still be found in the soil. Moreover, they have pointed out the fact that this bacillus never penetrates the pulp of sound vegetables.

I must also call your attention to the experiments undertaken by Straus and Dubarry to ascertain the vitality of the typhoid bacillus in water. They have shown that this bacillus was still living at the end of eighty-one days. In some previous experiments, Meade Bolton had noted their presence after three weeks. According to Wolffhugel and Riedel, the duration of the life of these microbes is twenty-eight days. The influence of purity of the water on the prolongation of the life of the *bacillus typhosus* is but little appreciable, and in distilled water, in the water of the Vanne, or in that of the canal of the Ourcq, Straus and Dubarry have seen these pathogenic microbes develop in a precisely similar manner. As for their virulence, it is absolutely intact, whatever may be the duration of the sojourn of these microbes in the water.

Must we admit, in accordance with Brouardel's opinion, that out of every hundred cases of typhoid fever, ninety have for their origin the usage of contaminated water? This is a point which merits discussion. While it is undeniable that the communication of typhoid fever is often effected by waters that have been polluted, it is probable that there are other factors which still escape us; in fact, we see typhoid fever appear and disappear in certain cities, and this without any real change being effected in the character or usage of their waters.

Take, for instance, the cities so numerous in France, where all or nearly all the dejections are discharged into the river which traverses them, and where the people of these cities drink only the water of this river. Typhoid fever appears there under the form of an epidemic more or less deadly, then ceases its ravages, and only a few isolated cases are now noted, and we cannot explain why at certain periods the epidemic has made so

* Grancher and Deschamps, "Researches on the Bacillus Typhosus in the Soil" (*Arch. de Méd. Exper.*, January 1, 1889).

many victims, and has been so benign at other seasons.

Even in cities where the inhabitants make use only of water that is absolutely pure, typhoid fever has not completely disappeared. At Vienna, which has often been cited in this connection, new cases were reported last year, so that we are obliged to confess that there are other factors which still escape us.

Wernich has maintained that meat undergoing putrefaction may cause typhoid fever, and he bases his opinion on the similarity which exists between the bacillus of putrefaction and the *bacillus typhosus*. I believe that this is a mistake. That altered meats, as we shall presently see, may give rise to toxic symptoms of typhoid form, is most certain, but they do not cause typhoid fever,—that is to say, that particular state characterized by the presence of the *bacillus typhosus*.

Nevertheless, of late this question of the possibility of the production of typhoid fever by the ingestion of the meat of diseased animals has been the subject of new researches. Writers have taken as the basis of their investigations the epidemics which prevailed at Kloten in 1878, at Bermenstorff in 1879, at Wurenlos in 1880, at Spreitenbach in 1881. At the autopsy of those dying from these epidemic diseases were found intestinal ulcerations, a voluminous spleen, and tumefied mesenteric glands. The animals that were the cause of these accidents were in most cases cows affected with puerperal diseases. Notwithstanding these results noted by careful observers, I persist in believing that these were cases of infectious gastro-enteritis with typhoid symptoms, and not true typhoid fever.

As a practical conclusion from what has gone before, it is evident that we ought to encourage all efforts to provide the inhabitants of our cities with pure drinking-water, and although this movement has slowly come about in France, it must be admitted that this question is now everywhere being agitated, and almost all our cities are making it a matter of obligation to give to the inhabitants potable water from sources that have not been polluted. When you are consulted on matters pertaining to the water-supply of towns, it will be your duty to require a most complete isolation of any fountain or water-source intended for the use of a given locality; it should be walled around and otherwise kept from the possibility of being polluted, and the infiltrations of the soil should not be allowed to penetrate it.

In any event, during epidemics you should recommend the use of boiled waters or of table-waters. In the regiments where there are percolators for making coffee, you can use these apparatuses, which, at very small expense and trouble, will give you boiled water.

For rich people, you will prescribe the table-waters, to-day so numerous, and which, in times of epidemics, render us great service. You will reject the artificial Seltzer waters, because the presence of the carbonic acid in no way opposes the life and growth of the micro-organisms which these waters may contain; and, in order that the latter may be fit for use, they should first be boiled before being charged with gas, or else filtered through a Chamberland filter.

This filter, in fact, in depriving water of its bacilli, is a guarantee against the propagation of typhoid fever, and you should recommend it in all cases where you suspect that the water may be contaminated. The Chamberland filter, as you are all aware, is a porcelain cylinder. In employing this filter, you cannot too much keep in mind the necessity of being certain that it is absolutely intact, containing no cracks; and, moreover, you should be careful frequently to cleanse and disinfect it by exposing it to a strong gas heat or to the heat of a furnace.

With the exception of this filter and all constructed on similar types, the other filtering apparatuses should be rejected, for, as has been rightly remarked, if these filters, which are more or less complicated, may rid the water of the noxious principles which it contains, they rapidly become foul, coated over with dirt, and are then a source of contamination to the water, however pure, which passes through them; they are then more dangerous than useful.

It has been objected to the Chamberland filter that it demands a high pressure, which is rarely obtained. But it is quite possible at the present day, by employing a number of them grouped together, like the cells of a battery, to obtain, with very little pressure, enough potable water for the daily consumption.

The use of table-waters, boiled water, water filtered by apparatuses which deprive it of micro-organisms, such are the means to be put in operation to remove one of the most active causes of the propagation of typhoid fever.

But thus far in this question of prophylactic hygiene I have taken up only the subject of the possible propagation, by water or food, of microbe diseases. There are other affections of a parasiticism much more elevated, which depend for their transmission on food and drinking-water. I refer to the helminthic diseases, and, in particular, to those associated with the names tæniæ, hydatid cysts, and trichinæ.

I need not take up your time with the natural history of tæniæ and hydatids, which I have treated at considerable length in my "Diseases of the Stomach and Intestines."* I will only remind you that with respect to the tænia, it is by the consumption of measly pork or beef containing the cysticercus of the unarmed tænia that the propagation is effected. Hence it is that in our markets the sale of this meat is interdicted under a heavy penalty. This, however, does not prevent the tapeworm disease from being very common, for the following reasons: If it is easy to recognize measly pork, it is much less easy to detect the kindred cysticercus disease in cattle; and, moreover, the use of raw meat in therapeutics has become very general, and has, doubtless, had much to do with the spread of the tapeworm malady, for cooking is a prophylactic means, which, in destroying the cysticercus, destroys the contagious principle.

With reference to this particular point of the effect on meats of culinary heat, Decroix has defended the proposition that thorough cooking makes it safe for us to eat the flesh of animals affected with all the diseases reputed to be infectious and contagious; and at the Congress of Hygiene, held in Paris during the Exposition of 1878, he affirmed, by experiments made on himself, that there was no risk in eating the meat of animals which had succumbed to glanders, anthrax, cancer, etc., provided that this meat had been well cooked.

I believe that this position is untenable, and cannot be too strongly condemned. It is a very difficult matter to say when the cooking of our foods is done in an absolutely thorough manner, and as it has been proved that charbon may be developed by intestinal absorption, we cannot institute too rigorous measures to prevent animals affected with this disease from being sold in our shambles and markets.

* "Diseases of the Stomach and Intestines." Wm. Wood & Co., New York, 1886 (Library Series for 1886).

Cooking has a still more important *rôle* in the prevention of the transmission of trichina. While trichinosis has been observed in isolated sections of North America, and in Germany where there have been a great many epidemics, an instance of which is that of Emersleben, where forty-six persons succumbed (as recorded by Brouardel and Grancher), cases of this disease in France have been extremely rare. We may say that the disease is practically unknown among us, and the only instance which we can cite is that observed by Jolivet at Crèpy-en-Valois, of which Laboulbène has given us the account. This marked difference is due to the fact that, while in Germany the inhabitants eat a great deal of raw pork, and, in particular, raw sausages, in France we always subject these meats to a certain degree of cooking.

If meat is the chief factor in the transmission of tæniæ and trichinæ, hydatid cysts are communicated by drinking-water. The tænia echinococcus has its ordinary habitat in the intestine of the dog, and its ova are expelled with the excrements of the latter. When the storm-water after heavy rains washes out the roads, these eggs are carried along into some near brook or other water-source, and those that drink the water imbibe the germs of the hydatid cyst, which, after having traversed the digestive tube, are generally arrested in the liver, although they may clear this barrier and penetrate to all parts of the economy.

You should always have in mind this possibility of the transmission of a grave disease by the water of brooks or springs, and never drink such water without filtering it. Here the charcoal filter answers every purpose, and you will find for sale in the shops little pocket filters, which are extremely handy and useful. I pass now to the last part of my subject,—namely, to poisoning caused by putrefied meats.

When I spoke to you of the ptomaïnes and leucomaïnes, I told you that at the very moment of death ptomaïnes are produced, and that certain of them possess a very great toxic power. You will not, then, be surprised to learn that the ingestion of altered meats is capable of determining morbid accidents of the greatest gravity, and even death.

Writers have especially called attention to cases of poisoning brought about by the use of meats, canned or otherwise preserved, codfish, sausages, meat-pie made from the hare (*paté de lièvre*), hog's-head cheese, etc., and I must refer you for facts of this kind to the contributions of Robert, Durier, Camus,

Schaumont, Beringer-Feraud, Baillon, Brouardel, and Schmit.*

All these toxic manifestations appear from five to twenty-four hours after the ingestion of altered meats, and two periods may then be distinguished, the one of poisoning, the other of elimination. The first is characterized chiefly by anxiety, shivering, and then severe chills, headache, with vertigo and dazzling sensations; the second, by vomiting, a profuse diarrhœa, etc.; lastly, by the presence of albumen in great quantity in the urine. To these symptoms are joined a profound algidity, a tendency to somnolence, and a complete prostration of the forces.

This symptomatic aggregate is very similar to that which is determined by poisoning by mushrooms, and particularly the false orange-agaric, and this is easily understood, as the action of certain ptomaïnes is quite similar to that of muscarine.

As might have been inferred, cooking plays here a very important *rôle*, and always the symptoms of poisoning are the more intense the more imperfect has been the cooking. These ptomaïnes are so toxic that it requires but a very small quantity of putrefied meat to produce symptoms of the greatest gravity.

These facts show how rigorously municipal governments should enforce the proscription of all decomposing meats, and in particular of game and fish, and the earnest measures which should be taken for inspection of whatever is sold in the shambles and markets. Fish, as I have told you, undergoes a very rapid alteration, and ptomaïnes and amines of great toxicity are formed.

This same inspection should be exercised with regard to mollusks and crustaceans. Poisoning by muscles (*Mytilus edulis*) is very frequent, and has its source in the formation of *mytilotoxine;* that by oysters is not less frequent; and my laboratory chief, Bardet, has given an account of an instance of the kind where he was the sufferer.

These accidents are the more intense the more the channels of elimination are obstructed, and particularly the renal emunctory, and from this point of view of renal insufficiency this question of ptomaïnes and leucomaïnes presents a great interest.

It is recognized to-day that the symptoms formerly referred to uræmia or stercoræmia result from the retention of leucomaïnes or ptomaïnes in the economy, and that the treatment to be opposed to the development of these accidents is based entirely on dietetics, and on the employment of purgatives and diuretics.

The *rôle* of alimentary hygiene consists in introducing into the economy the least possible quantity of ptomaïnes, and here the vegetarian regimen admirably meets the indication.

I have often laid down the principles of this regimen, which gives me in all cases of renal insufficiency such good results, and you will allow me to reproduce here the main features of this dietary system:

You will require of the patient that he shall live exclusively on eggs, starches, green vegetables, and fruits.

The eggs shall be thoroughly cooked (omelets, scrambled eggs, custards).

The starchy substances shall be in a state of stew or pulp (*i.e.*, thoroughly cooked), such as potato soup, soup with red or white beans, peas, or lentils, *revalescière* (a mixture of several farinas), milk porridge, racahout, flour puddings, or puddings of rice, Indian meal, barley and oatmeal, strained panada, dumplings, "noodles," macaroni.

The green vegetables shall be well cooked (stews or soups containing carrots or turnips, Julienne soup, cooked salad, and spinach).

Fruits shall be stewed, instead of being eaten raw.

If fresh roast pork and bacon may be authorized in such a diet-table, it is because the prolonged cooking of the first and the salting and smoking of the second are an obstacle to the development of ptomaïnes.

You will absolutely forbid the use of fish and of game.

It is always in conformity to the same principles that we should direct the treatment of dilatation of the stomach. The prolonged sojourn of aliments in the gastric cavity favors the occurrence of fermentations there and in this way the production of ptomaïnes, and you should combat both by diet and all the means of intestinal antisepsis the evils which result from these vicious fermentations. I have not time here to take up this great question of intestinal antisepsis, which I have treated else-

* "Contribution à l'Étude des Ptomaïnes" (*Annales d'Hygiene*, 1880); Durier, "Note sur dix cas d'Empoisonnement par les Conserves de Bœuf" (*Archives de Médecine Militaire*, 1884); Camus, "Note sur l'Alteration des Conserves par les Ptomaïnes" (*Archives de Médecine Militaire*, 1886); Schaumont, "Relation d'un Empoisonnement par la Morue" (*Archives de Médecine Militaire*, 1878); Beringer-Ferand, "Recherches sur les Accidents que Provoque la Morue Altérée," Paris, 1885; Baillon, Pharmacien Major, "Des Ptomaïnes" (*Archives de Médecine Militaire*, 1885).

where in my "New Medications,"* and which is discussed in a masterly manner in the recent work of Professor Bouchard.†

Such, gentlemen, are the considerations which I desired to present relative to this question of "Prophylactic Hygiene." You will find, moreover, in my lectures on "Alimentary Hygiene"‡ the complement of the indications which I have here furnished, and it remains for me, in completing this course of lectures, to speak of legislation in its relation to prophylaxis, and this will be the subject of my next lecture.

SPINAL LOCALIZATION IN ITS PRACTICAL RELATIONS.§

By Charles K. Mills, M.D.‖

PART II.—THE FACTS AND RULES OF SPINAL LOCALIZATION.

IN a paper on "Cerebral Localization,"¶ I directed attention to the possibility of six classes of symptoms presenting themselves for the consideration of the neurological diagnostician,—namely, those of (1) local irritation, (2) local destruction, (3) local pressure, (4) invasion by lesions growing from adjacent areas to those under determination, (5) local instability, (6) reflex action at a distance. All or any one of these classes might require to be considered in localizing a spinal lesion, but the last three are not relatively of as much importance in spinal as in encephalic diagnosis; and, in order to restrict the present paper to reasonable limits, the discussion of this part of the subject will practically include only a study of symptoms of irritation, destruction, and pressure. Irritative, destructive, and compression lesions, whether intracranial or intraspinal, give rise mainly to three great classes of diagnostic phenomena,—reflex, sensory, and motor. Vaso-motor, trophic, visceral, thermic, psychic, and some special symptoms, have at times considerable importance, but are generally secondary in value for ordinary practical purposes to the three classes mentioned.

Under reflex phenomena are usually included the cutaneous reflexes,—scapular, epigastric, abdominal, cremasteric, gluteal, plantar, etc.; and the so-called tendon reflexes,—wrist-jerk, knee-jerk, ankle-jerk, ankle-clonus, perineal jerk, etc. Under the same head also come such phenomena as the involuntary reactions of the rectum, bladder, and sexual organs. Reflex symptoms may be, as might be expected from the functions of the spinal cord, of decided localizing value in spinal lesions, whereas for brain lesions they are usually only of general significance and value. Such reflexes as the scapular, epigastric, abdominal, cremasteric, gluteal, plantar, and rectal may, for instance, greatly help to fix the height of a lesion, as may also such phenomena as knee-jerk, muscle-jerk, and ankle-clonus, but the latter are sometimes in spinal as in cerebral cases only of general significance.

Some of the so-called reflexes are a guide to definite spinal segments. While, however, it is important and a great aid to prompt diagnosis to recognize quickly certain marked isolated symptoms, as disturbance of particular reflexes, on the other hand it is essential that such phenomena should not be misinterpreted. Exaggeration of certain reflexes, as, for instance, the ankle-jerk, knee-jerk, the cremasteric jerk, etc., indicates not merely disease producing irritability of the centres for these phenomena, but, it may be, rather disease or compression in the cerebro-spinal axis anywhere above these centres. Abolished knee-jerk may be indicative of extensive degenerative disease of the spinal cord, as in posterior sclerosis; or, it may, in much rarer cases, indicate limited disease of the particular segment of the cord related to the patellar tendon. Westphal,** for instance, has reported the autopsy of a case of dementia paralytica, in which the patellar reflex had been absent on the left side only; and in which sections of the cord showed extensive sclerosis of the posterior root zones at the junction of the lumbar and dorsal regions on the left side, while on the right was only a slight beginning of the sclerotic process.

Under sensory phenomena it is necessary to consider clearly the particular variety of sensation lost or perverted, the exact cutaneous areas affected by increase, depression, or perversion of sensation, the nerves in-

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* "New Medications," Detroit, Library Series, 1886, chap. v. p. 99.

† Bouchard, "Thérapeutique des Maladies Infectieuses." Paris, 1889.

‡ Dujardin-Beaumetz, "Hygiène Alimentaire." Paris, 1889.

§ Read before the College of Physicians of Philadelphia, March 3, 1889.

‖ Professor of Diseases of the Mind and Nervous System in the Philadelphia Polyclinic, etc.

¶ "Transactions of the Congress of American Physicians and Surgeons, First Triennial Session, Washington," p. 238, 1888.

** "Ann. Univ. Med. Sci.," vol. i. p. 95, 1888.

volved, the situation of their nuclei in the cord, and the relations of their origin to the intervertebral foramina. These sensory phenomena include the symptoms,—pain, hyperæsthesia, anæsthesia, and paræsthesia.

The great motor symptoms are paresis or paralysis, spasm, contracture, and tremor. In studying motor phenomena, we must consider not only the muscles affected by loss or exaltation of power, the exact nerve-supply to such muscles, and the intraspinal course of these nerves, but also the situation of the nuclei of these nerves in certain segments of the spinal cord, and even the particular cell-groups to which such nuclei belong. The value of a study in spinal localization depends largely upon the *exactness* with which we differentiate such phenomena and relate them to their lesions.

A good practical point is the importance of some single striking fact in spinal function in localization diagnosis for surgical or other purposes. That the phrenic or diaphragmatic spinal centre is situated in the fourth, or in the third and fourth cervical segments, should, for instance, be taken into full consideration in operations in this locality, great care being taken not to bruise or deeply injure the cord, or to explore with needles or by incision a region where such a vital centre has its abiding-place. Respiratory and cardiac phenomena occur with lesions at and above the phrenic centre; pupillary changes when the cord is affected above the level of the second dorsal nerve or segment; while extreme trophic or vaso-motor affections of the skin and its appendages are only present when the central gray matter, somewhat posterior to the central canal, is diseased.

My main object in this portion of the present paper is to give the methods of referring or relating sensory, motor, reflex, and other phenomena, which are distributed in limited regions of the body to the particular levels of the spinal cord in which they have their source or termination. It is necessary, for both the physician and surgeon, to have quick and ready methods of determining the position of a lesion in the spinal cord by a study of the symptoms presented. The study is a broad one, and, in considering it, a paper might be almost indefinitely extended; it is necessary, therefore, to seize upon salient features and methods of presentation.

SOME POINTS IN COARSE SPINAL ANATOMY.

Certain well-known anatomical facts should always be borne in mind when considering for practical purposes the question of spinal localization. We should remember that the spinal cord proper is only from seventeen to eighteen inches long, while the spinal canal to the last lumbar vertebra is about twenty-three inches, and, if the sacral portion and coccyx are included, four inches more should be added. The cord, therefore, is much shorter than the canal, and usually reaches only to about the second lumbar vertebra. As already indicated in Part I., one of the most important and most available positions for successful spinal surgery, in cases of localized lesion, is the region of the cauda equina, most of which is entirely below the spinal cord. We have, in other words, a comparatively extensive intraspinal region, in which the lesions are, strictly speaking, peripheral, and the diagnosis, both local and general, must be made with this fact fully recognized. That the spinal cord does not fill its canal transversely is also a familiar fact, the significance of which should also always be before us. The cord is, indeed, suspended very loosely in the canal. It follows, therefore, that many of the intraspinal lesions which are operable are membranous or bony in origin, and in symptomatology are, in part, at least, peripheral, as they involve nerve-trunks in their intraspinal course, however long or short this may be. Every one who wishes to become practically familiar with spinal anatomy for surgical purposes should study a series of transverse sections showing the relations of the spinal cord to its enclosing envelopes, membranous and bony. Even the dural sheath is much larger than is necessary for its contents. I have already referred to the fact growing out of such anatomical studies of the spine, that the spinal cord can be lifted with care so as to be the subject of operation on any of its surfaces, anterior or lateral, as well as posterior. A consideration of all the questions relating to the spinal membranes and spaces will eventually enable us to separate with fair accuracy the lesions which are supradural, subdural, and strictly speaking spinal.

For various reasons, operations for localized lesions, next to the cauda equinal region, probably offer more chances of success in the dorsal spine than elsewhere, owing to the less size of the cord and the less danger in operating. In the cervical and lumbar enlargements the greater bulk of the cord and the closeness of the nerve-roots is always to be considered. From one part of the cord, the smallest in transverse section, some of the largest nerves of the body originate. This is

the narrowed lowest extremity of the cord, the conus medullaris, in which the lower sacral nerves have their roots. It is a region small in general bulk, because, owing to its position, it contains few conducting tracts, although relatively a large amount of gray matter. Lesions of this conus medullaris, embedded in its net-work of great nerves, can be accurately made out by symptoms, and its actual and relative size to the membranes and spaces of the spine should therefore always be kept in view.

The intraspinal course of the spinal nerves should be absolutely familiar. Nearly all of the nerve-roots descend to the foramina, from which they emerge to be distributed to various parts of the body. The lowest nerves have, of course, the longest intramural course. Some facts about the relations of spinal segments to the vertebræ, foramina, and nerves are, doubtless, known to all, but are probably not much considered. The segmental nature of the spinal cord will be referred to presently at some length. The term spinal segment is used to indicate the limited vertical portion of the cord from which arises each pair of spinal nerves. In the cervical region are eight of these segments, but only seven vertebræ; hence the eight pair of spinal nerves emerge from their foramina in such a manner that, although they all descend a little in their course, they emerge after the first, so that the segments, are located opposite spines and bodies of the vertebræ, which do not correspond in name. The third cervical segment, for example, according to Gowers, is about opposite the first cervical spine, and its nerves emerge between the second and third cervical bodies. The eighth cervical segment is about opposite the sixth cervical spine, or the junction of the sixth and seventh, and its nerves emerge between the seventh cervical and first dorsal body. In the dorsal region the segments are the longest of the entire cord, and they are not situated numerically opposite the spines and bodies of the same name in any single case. The first dorsal segment is nearly opposite the seventh cervical spine and body; the second dorsal nearly in a line with the first dorsal spine and body. The tenth, eleventh, and twelfth dorsal segments are much shorter than the segments from the first to the ninth, and these three segments are included chiefly between the eighth and tenth dorsal spines and bodies. The entire eleven spinal segments, from the first lumbar to the coccygeal, inclusive, are crowded vertically between the eleventh dorsal and second lumbar spines and bodies, a space of only about two to three inches.

Commonly, we speak only of two sets of nerve-roots,—the anterior or motor, and the posterior or sensory,—the great discovery of Sir Charles Bell. Bell, however, really divided the nerve-roots throughout the central nervous system into three sets, the third being a lateral or respiratory set, and containing nerves which excite motions which depend on or are related to the act of respiration. Gaskell* says that physiologists have failed to follow this because the triple arrangement of these nerve-roots was not immediately evident, like the separation of the anterior and posterior roots. This lateral tract of nerve-roots is the same as the non-ganglionated part of the splanchnic root.

These lateral roots do not concern us much with our present lights in determining questions of localization. When, however, visceral and vascular localization have been more perfected, the question of the existence and involvement of these lateral groups will receive greater attention. Every segment of the spinal cord, according to Gaskell, gives origin to two roots, a somatic and a splanchnic,—the latter being the roots of the nerves supplied to the viscera and blood-vessels; the former to the muscles, skin, and tissues other than those which are vascular and visceral. The somatic roots are, in other words, the motor and sensory, or the anterior and posterior roots, and in the main are connected respectively with the cells of the anterior and posterior cornua. The lateral roots arise from two columns of nerve-cells,—namely, the column of Clarke and a column in the lateral horn. The splanchnic root arising from the column of Clarke is ganglionated, while that arising from the lateral horn is non-ganglionated; and the nerves corresponding to the latter go to muscular tissues chiefly. Lesions of these nerve-roots, or of the cell-groups or columns of the cord, with which they are connected, give rise chiefly to vaso-motor, trophic, secretory, and visceral phenomena, distributed in accordance with the segment of the cord or the special pair of nerve-roots implicated. These lateral roots are found in greatest number in the region from the second thoracic or dorsal segment to the first lumbar.

SEGMENTAL CHARACTER OF THE SPINAL CORD.

One of the first steps towards an understanding of spinal localization is the full rec-

* *Jour. Physiol.*, vii. 1–80. London, 1886.

ognition of the segmental character of the spinal cord. It is to be regarded not as a single organ, but as a series or succession of organs vertically linked together,—a chain of segments one placed above another. In many of the lower animals, as in fishes and snakes, this arrangement is obvious, the spinal cord being made up of a series of alternating swellings and constrictions. "Each segment," says Bramwell,* "may be viewed as a distinct spinal unit, or, to speak somewhat figuratively, as a distinct spinal cord for a definite area of the body,—viz., that portion of muscle (muscular area) to which its anterior roots proceed, and that portion of skin, tendon, muscle, mucous membrane, viscus, etc. (sensitive area), to which the fibres of its posterior nerve-roots are distributed. Now, the essence of the clinical examination of the spinal cord consists in the separate and systematic examination of each spinal segment by observing the motor, sensory, reflex, vasomotor, and trophic conditions of the body area." According to Professor Hill,† of Cambridge, the recognition of the segmental succession in the arrangement of the nuclei of the nerves of the spinal cord is due to the late Professor Aeby. In the Hunterian Lectures, in 1885, Hill applied this principle of segmentation to the brain, or, at least, to the cranial nerves, attempting to fix the position in the cerebral axis of the nuclei of these nerves by a consideration of their segmental distribution in the head.

LOCALIZING PHENOMENA REFERABLE TO THE CONDUCTING TRACTS IN THE SPINAL CORD.

The spinal cord of man, besides being a great centre, or collection of centres, includes also a conducting medium, through which the great tracts (motor, sensory, etc.) pass, to connect the brain with all the segments situated below, and these segments with each other. In man, the conducting tracts may be regarded as developmental additions to the original spinal segment. It is in its capacity as a centre—in the capacity of each segment as a special centre—that we are particularly concerned in studying spinal localization, but the symptoms produced by irritation, destruction, or compression of the conducting tracts will often greatly modify an opinion as to the exact height, and particularly the extent of a lesion. I cannot, of course, go into a lengthy consideration of the functions of the white substance of the cord. This can be found in the treatise of Gowers, or any good work on nervous diseases. For completeness, however, I will summarize the subdivisions of the cord and their functions, and make some practical applications to the subject of localization, in the main following Gowers in giving the functions of the different subdivisions. A transverse section of the cord at different heights would give a somewhat but not greatly differing appearance. In a portion of the cervical region the greatest number of subdivisions are present. Starting here with the posterior median portion of the cord,—the part which would be first exposed by the surgeon's knife and saw,—the posterior column is divided into two parts,—the *column of Goll*, or *postero-median column*, and the *column of Burdach*, also known as the *postero-external column*, or *posterior root zone*. The column of Goll in all probability conducts tactile impressions. The column of Burdach, containing, as it does, the posterior root-fibres, has for its function the conveyance of sensory impressions inward through these root-fibres, and probably also for short distances it carries these sensory impressions vertically. Just external to the periphery of the posterior horn begins a most important conducting tract,—*the pyramidal tract*, or, as it is usually called, *the lateral or crossed pyramidal tract*,—which occupies the posterior half of the lateral column outside of the posterior horn. Its function is unquestionably chiefly motor conduction, particularly from the brain to the parts below the arm. A column, shallow from without inward, but wide circumferentially, is the *direct cerebellar tract*, which lies chiefly between the lateral pyramidal tract and the periphery of the cord. Flechsig believes that this column conducts impressions from the muscles of the trunk. When diseased it degenerates upward, and therefore its function must be to conduct upward. It is probably connected with Clarke's vesicular column, and therefore with visceral and vascular sensibility and control Between the pyramidal tract and the concavity formed by the junction externally of the anterior and posterior horns is a comparatively narrow space called *the lateral limiting layer*, whose fibres may connect the gray matter at the different levels. What Gowers has termed the *antero-lateral ascending tract* occupies about the same position in the antero-lateral columns as the direct cerebellar tract does in the postero-lateral

* "Diseases of the Spinal Cord," p. 1. Edinburgh, 1884.

† *Brain*, January, 1888.

column. Its function is believed by Gowers to be the conduction of the sensations of pain and temperature. In disease it certainly degenerates upward, and therefore must in health conduct upward. Journeying still towards the front of the cord and the median line, we find that the antero-lateral white substance is very largely occupied by what is now called the *column of the anterior ground-fibres*, a name given by Flechsig. The anterior root-fibres traverse it, and its function is probably also to connect the anterior horns at different levels, and through the anterior commissure the anterior horns of the two sides of the cord at the same or at different levels. Like the posterior root zone, the ground-fibres of this column do not degenerate through any considerable vertical length of the cord. Lastly, the *anterior pyramidal tract, or column of Türck*, is a narrow tract lying close to the anterior median fissure, sometimes varying in form and size, and having for its function the conduction of motor impressions from the brain to the arm. If this is its function its fibres must cross in the cord.

It is evident from this brief statement of the subdivisions of the white substance of the cord that, by closely bearing them in mind, the diagnostician will be greatly helped in locating the horizontal as well as the vertical position of a focal lesion, compressive or destructive, or both. Such a consideration may enable us to say, for instance, whether such a lesion is anterior, posterior, or lateral, or how much it occupies any one or more of these positions; or, finally, a matter of great importance, as pointed out by Horsley, the mode of extension of a unilateral lesion, by a tumor which eventually becomes bilateral.

One of the oldest, and, at the same time, one of the best, illustrations of the importance of bearing in mind the functions of the various columns or tracts of the cord is afforded by the affections known as spinal hemiplegia and spinal hemi-paraplegia, which are due to focal lesions confined to a lateral half of the spinal cord. In the first place, such a lateral lesion is modified by its height in the cord. If comparatively high up in the cervical region and completely unilateral, the patient would exhibit motor paralysis of both the arm and the leg on the side of the body corresponding to the seat of the lesion, because of the implication of the column of Türck or direct cerebral tract, and the lateral or crossed pyramidal tract, which both decussate above the lesion. Sensation would be affected chiefly on the side of the body opposite to the seat of the lesion, because of the involvement of the antero-lateral ascending tract and the column of Goll, and because also the sensory tracts decussate in the cord itself. From involvement of the direct cerebellar column, vaso-motor and visceral symptoms would be present, chiefly on the same side as the lesion. The temperature is sometimes higher, for instance, on this side. The pupil may be affected through the cilio-spinal centres. This is simply the gross, sketchy picture of a lesion high up in the cord. The phenomena would vary considerably according as the lesion was chiefly compressive, irritative, or destructive.

A unilateral focal lesion of the dorsal cord would give hemi-paraplegia. In such a case the arm, the pupil, and the neck escape. Motor paralysis occurs in the leg of the same side, and anæsthesia in the trunk and leg of the opposite side. Sometimes a band of hyperæsthesia, or even wide-spread hyperæsthesia, is present on the side of the lesion, due doubtless usually to irritation of nerve-roots.

Instead of this somewhat complete symptom-picture, we may have a set of symptoms which are dependent upon involvement of only one or two of the subdivisions of the white substance of the cord, although such exceedingly circumscribed lesions are comparatively rare. By the close study of history and symptoms we can sometimes trace the progress of a lesion from one tract to another.

Some peculiarities in sensory symptoms may occasionally give the clue to the possible extent of a lesion. The loss of the tactile sense, with the preservation of the senses of pain and temperature, for example, mentioned in one of the cases in the first part of this paper, was possibly of some value in connection with the question of the localization of the spinal paths for the transmission of the sensations of touch, pain, and temperature. Schiff's and Gowers's view, as stated, is that the lateral columns contain the tracts for sensibility to pain and probably also to temperature, and the posterior columns the paths for the conduction of tactile sensibility. In a case of focal lesion with compression, like the one reported, the existence of tactile anæsthesia, without loss of sensation of pain and temperature, would seem to be most easily explained on the supposition that the paths for these different sensations are not in exactly the same position in the cord. The columns for touch being

the most posterior, the tactile anæsthesia may have been due to counter-pressure from jamming backward of the cord by the vertebral displacement.

Let me say a few words about the vertical extension of the spinal conducting tracts. The column of Goll, or postero-median column, extends throughout the whole length of the cord. The postero-external column, or column of Burdach, posterior root zone of Charcot, continues throughout the entire cord, but degenerates only a short distance above a lesion. The direct cerebellar tract only reaches from the level of the first lumbar nerve upward, chiefly from the region of the vesicular column of Clarke; it does not, for example, degenerate from a lesion of the lumbar enlargement. The lateral limiting layer, between the lateral pyramidal tract and posterior horn, is throughout the cord. The fibres of the antero-lateral ascending tract of Gowers, often confounded with the cerebellar tract, pass upward through the whole length of the cord. The anterior ground-fibres also extend throughout the whole length of the cord. The column of Türck is present only in the cervical and upper dorsal cord. The lateral pyramidal tract extends through the whole length of the cord.

The importance of knowing the vertical extension as well as the position of the spinal columns for practical purposes is at once evident, and in diagnosis comes out with great distinctness in localizing focal lesions of very limited extent. Such a lesion might, for example, involve only or chiefly the columns of Türck, or anterior pyramidal tract, and would, therefore, give us motor-conducting symptoms, largely confined to the arms. If the lesion was lateral or peripheral, it might only or chiefly involve the ascending antero-lateral tracts, and give us for symptoms interference, with sensibility to pain and temperature, on one or both sides. The same reasoning can be readily extended to other isolated or neighboring tracts.

In considering a lesion below the upper dorsal region the practical diagnostician would not take into account the column of Türck, which has no existence below this level. The direct cerebellar column would also be out of consideration in large measure in lesions of the lumbo-sacral cord and cauda equina. On the other hand, the columns of Goll and of Burdach, the crossed pyramidal tract, the antero-lateral ascending tract, and the region of the anterior ground-fibres would be considered at any and all heights.

SEGMENTAL LOCALIZATION.

Theoretically, it is possible to localize a lesion in any segment of the cord. It is practically possible to do this in many segments of the cord, and for some the process with our present light is by no means difficult. For any vertical subdivision of the cord containing two or three segments we should be able to localize lesions with sufficient accuracy for grave operations.

In the detailed study of segmental localization, the order in which the subject will be considered is (1) sensory localization; (2) motor localization; (3) reflex localization; (4) the localization of vaso-motor and trophic phenomena. Regarding the cord as made up of a series of reflex systems, or reflex nerve-roots or arcs, as they are commonly called, sensory impressions are conveyed inward from the peripheral end organs to sensory roots and centres; thence are transferred to motor centres, and thence outward again reflexly to roots, nerves, and muscles themselves; so that the study of a single segment of the cord will include sensory, motor, and reflex phenomena. When the brain takes part the sensory impression enters the cord by the posterior nerve-roots, and, if not reflected at once, passes up the opposite side of the cord to the cerebrum, and eventually calls forth a motor impulse, which is sent down the cord to the anterior motor cells, and thence to the muscles.

SEGMENTAL SENSORY LOCALIZATION.

The sensory mechanism of the cerebro-spinal system consists, then, of peripheral end organs which receive impressions, incoming nerve-fibres which carry them by way of the posterior roots into the spinal cord, commissural fibres which immediately or almost immediately transfer them to the opposite half of the cord, and ascending conducting tracts by which they are conveyed up the cord to the oblongata, pons, crus, internal capsule, corona radiata, and brain cortex. Various interrupting ganglia are interposed along this sensory highway; but these we shall not here consider. Dividing one-half of the spinal cord will cause anæsthesia in the opposite half of the body below the place of hemisection, and at the same time a line or belt of hyperæsthesia or anæsthesia may be produced on the same side as the lesion in the distribution of some particular nerve-root or roots injured. This has already been referred to in considering spinal hemiplegia and hemiparaplegia. This anæsthesia is in the main caused by severance of the ascending con-

ducting paths for sensation, which are in the side of the cord opposite to the parts of the body supplied. It is necessary, however, to consider more particularly the sensory effects in certain territories and their special subdivisions, because of the implication of one or more segments, or limited vertical extensions, of the spinal cord.

Segmental sensory localization has not been much elucidated by the contributions of physiologists, who have done so much for motor localization. The contributions to segmental sensory localization are, indeed, few and of quite recent date. The most valuable, some of them already referred to in a general way, have been furnished by Ross* and Thorburn;† and by Herringham,‡ Paterson,§ and Goodsir,‖ who are quoted by Ross. The limits of this paper will allow me only to refer briefly to this subject, chiefly giving the facts determined by Ross and Thorburn. Heiberg's¶ "Atlas" was of value in my studies of the various sensory areas of the skin. The papers from which the most useful data have been obtained have been clinico-pathological and embryological,—studies of cases of injury to the spinal cord, intraspinal nerve-trunks, and extraspinal nerve-trunks and plexuses; and investigations chiefly developmental and morphological of the limb plexuses of the lower animals and of man.

A spinal nerve, as Ross shows, is derived from the cord by a posterior (superior) gangliated and an anterior (inferior) non-gangliated root. Where the two roots come together the nerve divides into a superior primary division supplying the skin of the back over the neural canal; and an inferior primary division, which subdivides into a dorsal trunk, supplying the lateral, and a ventral supplying the ventral or anterior surfaces. A branch is also given off the viscera.

The entire surface of the body may be divided into three great nerve territories,—one posterior, one lateral, and one anterior or ventral.

The sensory nerve-supply to the posterior territory is comparatively easy to understand. It is from the superior primary divisions of the spinal nerves. It occupies a region which may be roughly described as consisting of the back of the head and the back,—the region over the neural canal. Heiberg says that its lower limit may be taken to be roughly indicated by the crest of the ilium inside of the sacrum. The back of the head is supplied from the upper cervical nerves, because in the process of evolution the skin of the back of the neck has been dragged upward in order to cover the greatly-enlarged brain and skull of the man. This posterior nerve territory in the head reaches forward over the top of the head and forehead to the root of the nose, its anterior portion being supplied from the superior primary or first division of the trigeminal or fifth nerve. Ross compares the distribution of the sensory nerves in the dorsal or posterior region of the cord with that which is seen in the lowest vertebratæ,—the amphioxus, for example. In the amphioxus section of the posterior roots of a pair of nerves will cause anæsthesia of exactly corresponding sections of the body. In man section of the dorsal posterior roots, superior primary division, likewise produces anæsthesia of the skin of corresponding segments of the body, the only differences being that in man some anastomoses of different dorsal nerves occur, and the nerve areas of distribution tend to be placed successively lower with reference to the levels at which the nerves originate.

The anterior nerve territory of the trunk in a manner corresponds to the posterior territory,—that is, it occupies a position on the front of the trunk and face comparable in extent to that of the posterior territory on the back and head. The anterior and lateral cutaneous nerves of the thorax are branches from the same nerves. The lateral territory is the largest and in many respects the most important sensory surface. Heiberg says that the line of demarcation between the lateral and anterior territories generally divides the breast into two equal halves, the distribution of the anterior branches, however, extending on to the front of the thighs. The extremities are largely supplied by the lateral branches. In the neck the branches are all anterior and posterior; in the thorax the anterior and lateral cutaneous branches are from the same nerves.

The limb plexuses are formed from the union of the branches of the inferior primary

* *Brain*, April, 1884; ibid., January, 1885; ibid., January, 1888.

† *Brain*, January, 1887; ibid., January, 1888; ibid., October, 1888; *Brit. Med. Jour.*, December 22, 1888; and *Med. Chron.*, April, 1889.

‡ *Proc. Roy. Soc.*, vol. xli., 1887.

§ *Jour. Anat. and Phys.*, April, 1887; ibid., July, 1887; and *Quart. Jour. Micr. Sci.*, vol. xxviii., 1887.

‖ *Edin. New Phil. Jour.*, N. S., vol. v., January, 1887, and *Anat. Mem.*, vol. ii. Quoted from Paterson by Ross.

¶ "Atlas of the Cutaneous Nerve-Supply of the Human Body." By Jacob Heiberg, M.D. Illustrated by Alfred Fosterud. Translated and edited by W. W. Wagstaffe, B.A., F.R.C.S.

divisions of the nerves. The sensory nerves from the two branches of this inferior primary division are very irregularly distributed in the limbs,—that is, looking at the matter from a gross topographical point of view. This is due to the fact that, in the process of development of the limbs in the evolution of higher from lower animal forms, the sensory nerves, both dorsal and ventral, have been irregularly arrested in the extremities. In the formation of the plexuses the dorsal branches nearly always unite with the dorsal, and the ventral with the ventral branches only; although Paterson, according to Ross, admits exceptions in the case of the small sciatic nerve, which is formed by a union of dorsal and ventral fibres, and in that of the external and short saphenous nerves which are undoubtedly so constituted.

In the limbs, then, the sensory disturbances which are due to involvement either of the cervical or lumbo-sacral segments of the spinal cord, or of the nerve-roots or nerves springing from these segments, are distributed more or less longitudinally in accordance with the particular segment or nerve affected. The hyperæsthesia, for example, which in a dorsal lesion extends around the trunk in the form of a belt or girdle, in a cervical or lumbo-sacral lesion has a longitudinal distribution more or less regular in the limbs. In like manner, the anæsthesia and paræsthesia present in the limbs have distributions in accordance with the shape of the cutaneous sensory areas. A knowledge of sensory segmental localization is therefore necessary that the diagnostician shall quickly be able to decide on the spinal or other localization of a lesion by the zone of disturbance in the limb.

Sensory segmental localization follows certain laws. If the upper extremity, according to Ross, be placed in the embryological position,—that is, with the thumb directed outward and upward, the palm forward,—the preaxial border from the tip of the shoulder down to the metacarpo-phalangeal articulations of the index-finger and thumb is supplied by the fifth cervical root, and the postaxial border, from the axilla to the finger-tips inclusive, is supplied by the humeral branch of the second, the first dorsal, and the eighth cervical nerves. Observations made in cases of disease of the cauda equina have also convinced Dr. Ross that, if the lower extremities be also placed in the embryological or tailor position, the preaxial border is supplied by the cutaneous nerves of the four upper lumbar nerves, and the postaxial by the coccygeal and sacral sensory nerves. He has concluded also that the most distal parts of the preaxial border were supplied from the lower of the four lumbar nerves, and of the postaxial border by the higher sacral nerves.

The chief law of sensory distribution, as worked out by Herringham and adopted by Ross, is as follows:

"A. Of two spots on the skin, that which is nearer the preaxial border tends to be supplied by the higher nerve.

"B. Of two spots in the preaxial area, the lower tends to be supplied by the lower nerve; and of two spots in the postaxial area, the lower tends to be supplied by the higher nerve."

While many cases of disease limited to the anterior horns or to particular cell groups of these horns have been recorded, I do not know of any reports of lesions circumscribed in the posterior horns of particular segments of the cord. Most of our practical knowledge of sensory segmental localization is therefore to be derived from cases which have been reported by Ross, Thorburn, and others, in which both the cord and nerve-roots have been injured extensively. To the papers of these observers I will refer those interested for details, giving here only some of the summarized conclusions.

Thorburn,* for example, in one of his papers on spinal localization as indicated by spinal injuries, speaks as follows with reference to the distribution of anæsthesia in the upper limbs: "Dr. Ross has fully demonstrated the distribution of the sensory nerves in the upper limb. Regarding the limb in its embryological position, we find that it is projected as a bud from the trunk, the hand being supine and the radius upward, so that the palmar surface is anterior. In this position the bud carries out with it branches of the anterior primary divisions of the spinal segmental nerves from the fifth cervical to the first dorsal, inclusive; and as these nerves maintain in the adult their embryological relations, we have the several roots supplying the limbs in numerical order from the radial to the ulnar side. Hence, then, the higher the paralysis extends in the cord through the brachial region, the farther will the anæsthesia extend from the ulnar towards the radial side. This arrangement is fully demonstrated by our cases. It is necessary to refer again to the distribution which will be obvious to any one who takes the trouble to read the reports,

* *Brain*, October, 1888.

and of which I have already spoken in my previous paper. It will be found that the fifth root supplies the region overlying the deltoid muscle, and the outer aspect of the arm and forearm as far as the styloid process of the radius or base of the thumb, and that the eighth cervical and first dorsal supply the little finger and inner side of the hand, forearm, and arm, the remaining roots providing for the central parts of the limb on both anterior and posterior aspects. It will, however, be found that these central roots supply relatively a much less extensive area than those above and below them."

In his paper on injuries to the lumbo-sacral region,* Thorburn likewise summarizes the sensory distribution of the various lumbo-sacral nerve-roots. This summary is as follows:

"First lumbar nerve: ilio-hypogastric and ilio-inguinal.

"Second lumbar nerve: outer (?) and upper part of thigh.

"Third lumbar nerve: anterior aspect of thigh below second lumbar.

"Fourth lumber nerve: anterior part of leg.

"Fifth lumbar nerve: Back of thigh, except in distribution of first, second, and third sacral.

"First sacral nerve: a narrow strip on back of thigh; back of leg and ankle; sole; part of dorsum of foot.

"Second and third sacral nerves: perineum, external genitals, 'saddle-shaped' area of back of thigh."

MOTOR LOCALIZATION.

Methods, anatomical, physiological, microscopical, clinico-pathological, and clinical, have all contributed their share to our knowledge of motor localization; and to some of the results obtained in each of these ways I will briefly refer.

ANATOMICAL RESEARCHES.

Herringham carefully and patiently dissected the nerves of the brachial plexus on many subjects, fœtal and older, in order to trace these nerves to their final destinations in the muscles and the skin. He gives a tabular statement showing the usual nerve-supply of muscles of the upper limbs, as follows:

"Third, fourth, and fifth cervical: levator anguli scapulæ.

"Fifth cervical: rhomboids.

"Fifth, or fifth and sixth cervical: supraspinatus, infraspinatus, teres minor.

"Fifth and sixth cervical: subscapularis, deltoid, biceps, brachialis anticus.

"Sixth cervical: teres major, pronator teres, flexor carpi radialis, supinator longus and brevis, superficial thenar muscles.

"Fifth, sixth, and seventh cervical: serratus magnus.

"Sixth and seventh cervical: extensor carpi radialis.

"Seventh cervical: coraco-brachialis, latissimus dorsi, extensors at back of forearm, outer head of triceps.

"Seventh and eighth cervical: inner head of triceps.

"Seventh, eighth, and ninth cervical: flexor sublimis, flexor profundis, carpi ulnaris, longus pollicis, and pronator quadratus.

"Eighth cervical: long head of triceps, hypothenar muscles, interossei, deep thenar muscles."

PHYSIOLOGICAL RESEARCHES.

Few experimental investigations with reference to the exact functions of the nerve-roots and horns of the spinal cord have been made. One of the most important and earliest of these researches was that of Ferrier and Yeo in 1880.† These investigations were as to the effects of irritation of the motor roots of the brachial and crural plexuses of monkeys. The faradic current was employed. It was found that each motor root represented a distinct functional combination. The muscles set in action were so related as to bring about a definite action of an adapted nature. The muscles affected by electricity exciting any one root were related in function. The relation was not simply one of contact or nearness.

The actions produced by the different roots were summarized by Ferrier as follows:

"First dorsal: action of the intrinsic muscles of the hand, muscles of the ball of the thumb, interossei, etc.

"Eighth cervical: closure of the fist, with pronation and ulnar flexion of the wrist, retraction of the arm, with extension of the forearm.

"Seventh cervical: the *scalptor ani* action,—viz., adduction with rotation inward and retraction of upper arm, extension of forearm and flexion of wrist and fingers, so as to bring the tips against the flank.

"Sixth cervical: the movement of 'atten-

* *Med. Chronicle*, April, 1889.

† *Proc. Roy. Soc.*, London, No. 212.

tion,'—viz., adduction and retraction of upper arm, extension of forearm, pronation and flexion of wrist, the palm of the hand being brought towards pubes.

"Fifth cervical: movement of the hand towards the mouth,—viz., raising the upper arm inward, flexion of the forearm with supination, and extension of the wrist and fingers.

"Fourth cervical: a similar movement of forearm and hand,—viz., the upper arm is raised upward and backward."

The actions of the *lower extremity* were respectively:

"Second sacral: action of the intrinsic muscles of the foot,—viz., adduction and flexion of the hallux, with flexion of the proximal phalanges and extension of the distal.

"First sacral: flexion of the leg, plantar flexion of the foot, flexion of all the toes at the proximal phalanges, and also of the distal phalanx of the hallux.

"Fifth lumbar: outward rotation of the thigh, flexion and inward rotation of the leg, plantar flexion of the foot, and flexion of the distal phalanges.

"Fourth lumbar: extension of the thigh, extension of the leg, and pointing of the great toe.

"Third lumbar: flexion of the thigh and extension of the leg."

Paul Bert and Marcacci,* in 1881, studied the distribution of the motor roots of the lumbar plexus, their researches being made on dogs and cats. The nerves were very carefully cut close to their origin, and stimulated electrically with the utmost care. "It was found that the first root of the lumbar plexus determines the contraction of the sartorius, the rectus, and the psoas muscles, which are closely connected in the dog and cat, and all of which flex the hip upon the trunk. The second root of the plexus excites contraction in the anterior portion of the vastus externus, a part of the tensor of the fascia lata, and the vastus internus,—*i.e.*, in the muscles which extend the leg on the thigh. The function of the third root is similar to that of the second, with some differences in detail. It excites part of the vastus internus, the anterior part only of the biceps, which is an extensor, while the posterior portion is a flexor. The fourth root causes movements in the posterior part of the biceps, the semi-tendinosus and the semi-membranosus (flexors of the leg and thigh), and the second and third adductors of the thigh, and the extensors of the thigh. It thus innervates three kinds of movements, which are in no respect opposed or contradictory. The fifth root presides over the movements of the tail. From these results the experimenters conclude that there is evidently a systematic arrangement of the innervation of the limb at the origin of the nerves of the spinal cord; it is a functional systematization,—*i.e.*, the motor filaments arising at a given level are distributed to muscular masses, which act together, and concur to produce an associated movement. In the second place (as Duchenne long ago demonstrated and as is now generally recognized), the anatomical unity of a muscle has no physiological correspondence. A single muscular mass may be in one part a flexor, in another an extensor. But the nerve distribution corresponds to the function, in so far as the different roots, innervating the several functions, are concerned."

Other researches, which are referred to by Ferrier and Yeo, have been made on the lower animals with a view to determine the situations of the roots of the plexuses of the limbs. Peyer and Krouse found that most of the muscles of the limbs were supplied by more than one root of the plexus. It was determined, among other things, that the muscles nearer the shoulder were supplied by the higher roots and those of the hand by the lower roots of the plexus; also that the sensory roots have a corresponding distribution to the distribution of the anterior roots.

During the operation by Dr. Abbe† on Dr. Dana's case of intractable brachial neuralgia, several interesting experiments were made with the faradic battery, so far as I know the first of the kind on man. With a sponge electrode on the back, a metal-point electrode was applied at various points. When applied to the sixth nerve, just external to the dura, it caused contraction of the supra- and infra-spinati, rhomboid, latissimus dorsi, pectoralis major, teres, and deltoid. Application to the seventh nerve caused contraction of the pectoral, latissimus dorsi, and abductors of the arm; to the eighth nerve, similar contraction and pain.

MICROSCOPICAL INVESTIGATIONS: CELL-GROUPS WHICH REPRESENT PHYSIOLOGICAL UNITS IN THE HORNS OF THE SPINAL CORD.

Microscopical investigations show that in cross sections of the spinal cord a distinct

* The results obtained by Bert and Marcacci were summarized in the *Lancet* for October 1, 1881.

† *Medical Record*, February 9, 1889.

transverse localization of cell-groups which are related to certain definite muscles or muscular groups concerned in particular movements may be readily determined. The cord is not only an organ composed of a series of segments placed one above the other, but these segments differ in size both vertically and horizontally. The gray matter particularly shows marked differences in shape and size in various transverse sections. These differences depend largely upon the number and grouping of the cells.

Starr, drawing from various investigations, details at length the manner in which in the anterior horns of the cord the cells are arranged in distinct groups which can be determined and enumerated from within outward. He gives a series of diagrams which show the manner not only in which these cells are arranged in clusters at certain levels of the cord, but also how these continue or fail to continue in a vertical direction from one level to another.

These cell-clusters differ in number and in relative position at various heights in the cord. In the second cervical segment, for example, are three, two continuing downward into the third segment of the cord, the third even into the fourth segment. In the fourth cervical segment the number of groups is five. Again, in the fourth lumbar segment and below this as far as the sacral three groups are present. These groupings in the cord are enumerated and described by Starr and also by Gowers and Ross. The only point for us to remember in connection with practical localization is that each of these groups is probably a physiological unit. They are spinal centres of function comparable to the cerebral centres of motor function. Spitzka, in 1880, first advanced this opinion :

"The nearer the muscle is to the ventral aspect of an animal," he said, "the nearer will its nucleus be to the median line of the cord ; and the nearer the muscle is to the dorsal aspect of the animal, the nearer will its nucleus be to the lateral cornu of the cord. Flexor nuclei are therefore in internal, extensor nuclei in external and posterior cell-groups. Thus the cell-group in the apex of the anterior horn as well as in the lateral cornu is fairly developed in the dorsal region, while the portion of the gray substance situated internally is deficient in cells, in evident relation to the deficiency of prevertebral muscles. To the extremities of the body, lateral extension of the cornua correspond, and in these the same relative position of flexor and extensor nuclei is probable. As is shown in the enlargements, there is much more differentiation of the cell-groups in such extensions in the multidigitate animals than in the solipeds, as is shown by comparing the cord of man with that of the horse. Whether groups of muscles be flexor or extensor, it will be found that the nearer they are to the animal axis, the nearer will their nuclei be to the central canal. This is especially true of the flexor nuclei. The increasing development of a cell-group in the upper cervical region near the central canal in animals with powerful head and neck flexors seems to support this statement. Extensors remote from the axis, such as the trapezius, have their nuclei quite remote from the central canal." (Quoted by Starr.)

The diagnosis of a spinal lesion in the horns or columns of the cord may sometimes be at least of negative importance in deciding the question of operation. This was illustrated in the case of Lloyd and Deaver, of a cyst or extravasation of the cervical region of the cord. The lesion in this case was found to be a hemorrhagic extravasation in the anterior horns of the cord, practically out of reach of the knife. In this case, however, an external swelling which made operation important was present. If the external indications had not been present, the close diagnosis of the exact location of the lesion in a transverse section of the cord would have been of great importance. We have now data on hand for such localization at different levels. We can even make a fairly exact diagnosis of the position of a lesion at various positions from within outward in the anterior horns of the cord.

It may even be found that our knowledge of the exact position from without inward of these groups of cells which represent physiological units—which are, in other words, related to certain definite movements—may occasionally prove of practical value. Decision as to operating, for example, may depend not only upon our knowledge of the exact level and vertical limitations of a lesion, but also to some extent upon the amount of compression and of destruction by invasion of the spinal cord. As has just been stated, the nuclei of extensor muscles are situated in external and posterior cell-groups, while those of flexor nuclei are more internal ; therefore, the predominance of extensor or of flexor paralysis may help sometimes to a conclusion as to the amount of transverse damage of the cord.

CLINICO PATHOLOGICAL AND CLINICAL INVESTIGATIONS.

As already stated, Thorburn has published certain clinical and pathological observations upon injuries to the cervical region of the spinal cord, and has endeavored to draw therefrom an accurate picture of the functions of each of the nerve-roots entering into the formation of the brachial plexus. His usual method consisted in noting accurately the distribution of the paralysis and anæsthesia which ensued immediately upon a lesion of the cord, of which the exact site had been determined by post-mortem examination; also of pursuing the changes which resulted from the consequent ascending myelitis. He has also applied the same methods to the lumbo-sacral or crural plexus.

He has tabulated provisionally, as follows, what he is led, from the evidences of his cases, to believe to be the arrangement, from above downward, of the muscle nuclei in the cervical cord:

"Fourth cervical nerve: supraspinatus and infraspinatus, teres minor. (?)

"Fifth cervical: biceps, brachialis anticus, deltoid, supinator longus, supinator brevis (?).

"Sixth cervical: subscapularis, pronators, teres major, latissimus dorsi, pectoralis major, triceps, serratus magnus.

"Seventh cervical: extensors of the wrist.

"Eighth cervical: flexors of the wrist.

"First dorsal nerve: interossei, other intrinsic muscles of the hand."

He has likewise summarized for the lumbo-sacral region of the spinal cord the arrangement of both the motor and sensory fibres of the nerve-roots. His summary, he states, is to be distinctly understood as only that for which his own cases gave evidence,—that is, they are positive evidence for the facts reported, but do not negative the existence of other facts the existence of which was not proved by the cases. Thus, for example, although no doubt the second lumbar root affords muscular branches, these are ignored because his cases yield no evidence of the same. His summary of the sensory arrangement has already been given. The following is the motor distribution as determined by him:

"First lumbar nerve: none.

"Second lumbar: none.

"Third lumbar: sartorius, adductors of thigh, flexors of thigh.

"Fourth lumbar: extensors of knee, abductors of thigh.

"Fifth lumbar: hamstring muscles.

"First and second sacral: calf muscles, glutei, peronei, extensors of ankles, intrinsic muscles of foot.

"Third sacral: perineal muscles (erector penis, transversalis perinei, accelerator urinæ, etc.).

"Fourth sacral: bladder and rectum."

Ferrier,* in a paper on atrophic spinal paralyses, has applied the facts determined by his and other experiments, and made a provisional enumeration as a guide to further more minute clinical research, of the muscles which are likely to be affected in poliomyelitis limited to each segment, the muscles being placed in the order in which they would probably suffer.

"First dorsal type: the intrinsic muscles of the hand, viz., muscles of the thenar and hypothenar eminences and interossei.

"Eighth cervical type: long flexors, ulnar flexors of wrist, intrinsic muscles of hand, extensors of wrist and phalanges, long head of triceps (pectoralis major?).

"Seventh cervical type: teres major, latissimus dorsi, subscapularis, pectoralis major, flexors of wrist and fingers (median), triceps.

"Sixth cervical type: latissimus dorsi, pectoralis major, serratus magnus, pronators (flexor of wrist?) triceps.

"Fifth cervical types: deltoid (clavicular portion), biceps, brachialis anticus, serratus magnus, supinator longus, extensors of wrist and fingers.

"Fourth cervical type: deltoid, rhomboid, supra- and infraspinatus (teres major), biceps, brachialis anticus, supinator longus, extensors of wrist and fingers, diaphragm."

In the lower extremity:

"Second sacral type: intrinsic muscles of the foot, strictly parallel to the first dorsal type.

"First sacral type: muscles of calf (plantar flexors), hamstrings, long flexor of big toe, intrinsic muscles of foot.

"Fifth lumbar type: flexors and extensors of toes, tibial muscles, sural muscles, peroneal muscles, outward rotators of the thigh, hamstrings.

"Fourth lumbar type: extensors of thigh, extensor cruris, peroneus longus, adductors.

"Third lumbar type: ilio-psoas, sartorius, adductors, extensor cruris."

On the principles of localization certain types of spinal paralysis have also been determined and named by others, as by Remak and Erb. Remak speaks of an upper-arm

* *Brain*, vol. iv. p. 226, 1881–1882.

type of atrophic spinal paralysis, in which are jointly affected the supinator longus with the brachialis anticus and the biceps and the deltoid. The same author describes the forearm type in which the extensors of the wrist and fingers, and the muscles of the hand are paralyzed. He has also described three types of paralysis of the lower extremities,—"The first in which the extensors and adductors of the leg are affected together, the sartorius muscle, however, escaping, although it is supplied by the anterior crural nerve, which also supplies the extensors; a second type, in which the ilio-psoas, sartorius, and flexors of the leg are affected together; and a third type, in which the muscles upon the leg and foot are involved with the exception of the tibialis anticus. He notices that the last-named muscle is rarely paralyzed with the other muscles, and that when it is affected, the other muscles moving the foot frequently escape." (Starr.)

SEGMENTAL LOCALIZATION OF REFLEX CENTRES.

Certain cells in the gray matter of the spinal cord preside over reflex action. These reflex actions, and the areas in which they are capable of being excited, are described in the more recent text-books. These centres are cutaneous or superficial, and muscular (or musculo-tendinous) or deep. The centres for these various reflexes are enumerated by Gowers as follows:

"Superficial reflex action: plantar, second sacral; gluteal, fourth lumbar; cremaster, second lumbar; abdominal, sixth to eleventh dorsal (epigastric, sixth dorsal); scapular, fifth cervical to first dorsal.

"Muscle reflex action: calf muscles (foot clonus), fifth lumbar and first sacral; knee-jerk, third and fourth lumbar; flexor digitorum, triceps, seventh cervical; biceps, supinator longus, sixth cervical."

An important set of reflex centres for localization purposes are those which preside over various actions more or less complex and involuntary. These include such as the following: Cilio-spinal, cremasteric, sexual, parturitional, vesical, and anal. Starr enumerates the position of these centres as follows: Cremasteric, first to third lumbar; vesical, third lumbar; rectal or anal, fourth lumbar. By other observers the cilio-spinal centre is placed in the lower cervical cord and dorsal, as far as the second or third dorsal vertebra. The sexual, or erection centre, has been placed without close localization in the lumbar cord, probably about the second or third lumbar segment. Korner has located what he terms the parturition centre at the level of the first or second lumbar vertebra. Those centres for complex reflexes which are really valuable for purposes of practical localization are the cilio-spinal, cremasteric, vesical, and anal centres; their position will be indicated in table at the conclusion of this article. The latest investigations of Thorburn and others indicate that the centres for the bladder and the anus or rectum are in the extreme lower part of the cord; in fact, in the terminal portion of the cord, the region of the third, fourth, and fifth sacral and the coccygeal nerve-roots.

VASO-MOTOR AND TROPHIC LOCALIZATION.

Vaso-motor and trophic centres are distributed throughout the entire vertical extent of the spinal cord. Those connected with the muscles are identical with or situated close by the corresponding motor nuclei in the anterior horns. Vaso-motor and trophic centres for the skin, nails, and joints also have a local habitation in the spinal cord. Pathological facts as those, for instance, which have been obtained in studying syringomyelia, point to the central gray matter of the cord as the probable seat of these centres. By the central gray matter I mean here that which is situated around or near the central canal. In the posterior portion of this central gray matter it is probable that the vaso-motor and trophic centres for the skin, nails, and joints are situated, while more anteriorly are probably placed the trophic centres for the bones. A special collection of large bipolar cells is found in the postero-internal gray matter, and extends in the form of a continuous column from about the seventh cervical to the second or third lumbar segment. This collection of cells first described by Lockhart Clarke is usually designated as Clarke's vesicular column, and has been referred to several times in this paper. It is now almost established by various pathological reports, and the careful anatomical and microscopical investigations of Gaskell, that this column represents a series of vaso-motor and visceral centres. Communicating nerves have been traced to and from this vesicular column to the ganglia and fibres of the so-called sympathetic nervous system. When, therefore, vaso-motor and trophic phenomena are present these regions of the central gray matter must be considered.

In 1884,* and again in 1888,† Starr summarized in tabular form the functions of the various segments of the spinal cord. His last table represents fairly well the status of spinal localization. In concluding this article I will give this table of Starr, with modifications based upon the results obtained by Herringham, Ross, Thorburn, and others. A study of this table, and of the various summarized statements which have already been given, will enable the diagnostician with approximate accuracy to localize the height of a lesion affecting the segments of the cord, or the spinal nerve-roots. In the column for sensation the cutaneous nerves are given in parentheses; this list is not complete, but it is hoped that it will be of assistance in sensory localization.

LOCALIZATION OF THE FUNCTIONS OF THE SEGMENTS OF THE SPINAL CORD.

Segment.	Muscles.	Reflex.	Sensation.
Second and third cervical.	Sterno-mastoid. Trapezius. Scaleni and neck. Diaphragm.	*Hypochondrium*(?) Sudden inspiration produced by sudden pressure beneath the lower border of ribs.	Back of head to vertex and neck. (Occipitalis major, occipitalis minor, auricularis magnus, superficialis colli, and supraclavicular.)
Fourth cervical.	Diaphragm. Deltoid. Biceps. Coraco-brachialis. Supinator longus. Rhomboid. Supra- and infraspinatus.	*Pupillary* (fourth cervical to second dorsal). Dilatation of the pupil produced by irritation of neck.	Neck. Shoulder, anterior surface. Outer arm. (Supraclavicular, circumflex, external (musculo-cutaneous) cutaneous.)
Fifth cervical.	Deltoid. Biceps. Coraco-brachialis. Brachialis anticus. Supinator longus. Supinator brevis. Deep muscles of shoulder-blade. Rhomboid. Teres minor. Pectoralis (clavicular part). Serratus magnus.	*Scapular* (fifth cervical to first dorsal). Irritation of skin over the scapula produces contraction of scapular muscles. *Supinator longus.* Tapping the tendon of the supinator longus produces flexion of forearm.	Back of shoulder and arm. Outer side of arm and forearm to the wrist. (Supraclavicular, circumflex, external cutaneous, internal cutaneous, posterior spinal branches.)
Sixth cervical.	Biceps. Brachialis anticus. Subscapular. Pectoralis (clavicular part). Serratus magnus. Triceps Extensors of wrist and fingers. Pronators.	*Triceps* (fifth to sixth cervical). Tapping elbow tendon produces extension of forearm. *Posterior wrist* (sixth to eighth cervical). Tapping tendons causes extension of hand.	Outer side and front of forearm. Back of hand, radial distribution. (Chiefly external cutaneous, internal cutaneous, radial.)
Seventh cervical.	Triceps (long head). Extensors of wrist and fingers. Pronators of wrist. Flexors of wrist. Subscapular. Pectoralis (costal part). Serratus magnus. Latissimus dorsi. Teres major.	*Anterior wrist* (seventh to eighth cervical). Tapping anterior tendons causes flexion of wrist. *Palmar* (seventh cervical to first dorsal). Stroking palm causes closure of fingers.	Radial distribution in the hand. Median distribution in the palm, thumb, index-, and one-half middle finger. (External cutaneous, internal cutaneous, radial, median, posterior spinal branches.)
Eighth cervical.	Triceps (long head). Flexors of wrist and fingers. Intrinsic hand muscles.	.....	Ulnar area of hand, back, and palm, inner border of forearm. (Internal cutaneous, ulnar.)
First dorsal.	Extensors of thumb. Intrinsic hand muscles. Thenar and hypothenar muscles.	.....	Chiefly inner side of forearm and arm to near the axilla. (Chiefly internal cutaneous and nerve of Wrisberg or lesser internal cutaneous.)
Second dorsal.	.....	.....	Inner side of arm near and in axilla. (Intercosto-humeral.)
Second to twelfth dorsal.	Muscles of back and abdomen. Erectores spinæ.	*Epigastric* (fourth to seventh dorsal). Tickling mammary region causes retraction of the epigastrium. *Abdominal* (seventh to eleventh dorsal). Stroking side of abdomen causes retraction of belly.	Skin of chest and abdomen, in bands running around and downward, corresponding to spinal nerves. Upper gluteal region. (Intercostals and dorsal posterior nerves.)
First lumbar.	Ilio-psoas. Rectus. Sartorius.	*Cremasteric* (first to third lumbar). Stroking inner thigh causes retraction of scrotum.	Skin over groin and front of scrotum. (Ilio-hypogastric, ilio-inguinal.)
Second lumbar.	Ilio-psoas. Sartorius. Quadriceps femoris.	*Patellar.* Striking patellar tendon causes extension of leg.	Outer side of thigh. (Genito-crural, external cutaneous.)
Third lumbar.	Quadriceps femoris. Anterior part of biceps. Inner rotators of thigh. Abductors of thigh.	.....	Front of thigh. (Middle cutaneous, internal cutaneous, long saphenous, obturator.)
Fourth lumbar.	Abductors of thigh. Adductors of thigh. Flexors of knee. Tibialis anticus. Peroneus longus.	*Gluteal* (fourth to fifth lumbar). Stroking buttock causes dimpling in fold of buttock.	Inner side of thigh, leg, and foot. (Internal cutaneous, long saphenous, obturator.)
Fifth lumbar.	Outward rotators. Flexors of knee. Flexors of ankle. Peronei. Extensors of toes.	*Achilles tendon.* Over-extension causes rapid flexion of ankle, called ankle clonus.	Back and outer side of leg, and ankle; sole; dorsum of foot. (External popliteal, external saphenous, musculo-cutaneous, plantar.)

* *Am. Jour. Neurol. and Psych.*

† *Am. Jour. Med. Sci.*, May, 1888.

First and second sacral.	Flexors of ankle. Extensors of ankle. Long flexor of toes. Intrinsic foot muscles.	*Plantar* (fifth lumbar to second sacral). Tickling sole of foot causes flexion of toes and retraction of leg.	Back and outer side of leg and ankle; sole; dorsum of foot. (Same as fifth lumbar.)
Third, fourth, and fifth sacral.	Perineal. Muscles of bladder, rectum, and external genitals.	Vesical centres. Anal centres.	Back of thigh, anus, perineum, external genitals. (Small sciatic, pudic, inferior hemorrhoidal, inferior pudendal.)
Fifth sacral and coccygeal.	Coccygeus muscle.	.....	Skin about the anus and coccyx. (Coccygeal.)

ANTIFEBRIN IN THE TREATMENT OF EPILEPSY.

By Theodore Diller, M.D., Danville, Pa.*

NINE cases of epilepsy in this hospital in which the treatment by antifebrin was inaugurated were not in the least selected, but were simply taken in a haphazard way. As a matter of fact, they represent a wide dissimilarity in many respects; and it has seemed to me that a group of cases which would comprise as many phases of the disease as possible would be the best suited upon which to test the efficacy of a new therapeutic agent. The fact must not be lost sight of, however, that while these cases present important differences, yet they are all alike, in that each one has a degree of psychical disturbance which is considered by two reputable physicians to be of such nature as to require detention in a hospital for the insane. The drug was given, with more or less interruption, during a period of about four and a half months,—viz., during part of October, and all of November, December, January, and February. For greater convenience in calculation, and because of the possibility that the effects of the remedy were not fully established until after it had been administered a short time, I consider that the drug has been taken only during the months of November, December, January, and February last; but, in comparing number of fits occurring in these months with those which took place in previous months, it would be obviously unfair to include the month of October in either list. So, in drawing comparisons, this month is omitted from consideration.

The drug was administered three times a day, dry, upon the tongue. Dose: 4 grains, except in Cases III. and VIII., where this amount was doubled. As the powder is tasteless and practically insoluble, this mode of administration, I think, will generally be found to be the best. Some patients, however, might prefer capsules, and, of course, the dose could easily be given in this way.

For obvious reasons, the only observations which could be made in the space of four months of the effects of any agent in the treatment of epilepsy, would be upon the frequency and character of the fits, and to a less extent, upon the general physical, mental, and moral *status* of the patient. Any estimate of the drug as a *curative* agent, based upon such meagre data, would be immature and unprofitable.

I will as briefly as possible cite the cases, all females, and make comments upon them afterwards.

Case I.—Aged 29; admitted 1884. Case of nine (?) years' standing; dark hair and eyes; rather undersized woman; slight figure; fair physical health; intellect very dull. Sits quietly in one place all day. No history of head injury, but large cicatrix noted just back of left frontal eminence, probably result of an old burn.

Case II.—Aged 16; stupid, expressionless face; silly, unmeaning grin. At times she is quite cyanotic; comprehends only simplest ideas; unable to attend to personal wants. General health poor. Refused medicine very frequently.

Case III.—Aged about 40. Fits very violent. She is nervous and uncertain in her movements. Moderately bright at times. Has periods of violent excitement after a fit.

Case IV.—Aged 15. Mental power very limited. Silly in manner, and, after a series of fits, seems to be for a time totally unconscious of her surroundings. Fits can be controlled by the use of bromides, but this treatment has a marked depressing effect, both mentally and physically.

Case V.—Aged 34. Laborer's wife; has had epileptic fits for past nineteen (?) years. Mother is an epileptic. Fits of *grand-mal* type; often nocturnal; always violent. Patient reads, sews, etc. She is pretty bright mentally, but apt to complain of trivial matters.

Case VI.—Aged 43; single; average height;

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slight figure; blonde; admitted 1884. History says she has from four to eight fits per week. Acts in a silly, child-like manner. Fits very violent.

CASE VII.—Aged 34; single; bright and ladylike ordinarily, but easily depressed in spirits; has violent outbursts of temper; unstable in character. Fits of *grand-mal* variety and without an aura.

CASE VIII.—Aged 42; married. Tall, thin woman; bilious temperament; stupid and morose. Sews and does light work pretty well; has periods of very violent excitement, which last several days. After they have subsided she has no remembrance of them.

CASE IX.—Aged 13; admitted 1887; very dull and stupid; gets fits in series; at times in the *status epilepticus*. Before actual onset of such a period she is usually much excited, tears clothing, throws any article she can out the window. Obstinate; apt to pick skin into open sores with pin. General health is poor.

The annexed table will be found convenient for drawing comparisons as to the number of fits occurring in each case while under the bromide and antifebrin treatments respectively.

The remedy appeared to be well borne in all cases. The mental and physical depression and gastric disturbance observed so often in the bromide treatment were not apparent. It will be observed that the greatest decreases in the number of fits under the antifebrin treatment are in Cases I. and V. There is less of a decrease in Cases III., IV., VI., and VIII., while in the remaining cases—II., VII., and IX.—there is slight increase. Of this last group, however, it may be said that the remedy did not have a fair chance, as it was so much of the time refused by the patient or set aside for a tonic treatment.

In Cases II. and III. no fits occurred in the month of September, and in Case IV. only one fit in each of the months of June and July. This while patient was under the influence of the bromide treatment. It shows well the strong controlling influence of this treatment when we compare the records with those of months immediately before or after the months mentioned. It will be noticed that no such marked contrasts are recorded under the antifebrin treatment. The antifebrin did not succeed in any one case, having an average of over ten fits a month, in completely abolishing the attacks during a single month, as was the case under the bromide treatment. Yet in the two cases (I. and V.) responding best to the antifebrin treatment the seizures were pretty uniformly diminished in number each of the four months this treatment was pursued. This is also, though in less degree, true of the remaining five cases, particularly if we leave out of consideration Cases II. and IX.

Table of Epileptic Fits.

Cases.	1888.								1889.		Average number of fits per month from May to September, inclusive.	Average number of fits per month from November to February, inclusive.
	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.		
I.	10	5	10	8	9	...	2	5	2	2	8 2/5	2 1/2
II.	9	13	12	12	0	...	9	8	16	9	9 1/5	10 1/2
III.	17	38	10	11	0	...	11	12	10	12	15 1/5	11 1/4
IV.	20	1	1	8	23	...	4	3	9	12	10 4/5	7
V.	12	3	10	5	11	...	2	3	3	0	8 1/5	2
VI.	7	6	12	5	7	...	8	4	5	3	7	5
VII.	2	2	2	0	1	...	4	3	3	0	1 4/5	2 1/4
VIII.	11	12	13	9	7	...	8	6	8	5	10 2/5	6 1/4
IX.	4	8	4	10	3	...	3	10	9	4	5 3/5	6 1/3
Total.	92	88	74	68	61	...	51	54	65	47	76 4/5	54 1/4

Cases I. and V. took the antifebrin during the four months continuously, except two weeks in December. The administration of the drug in the remainder of the cases was interrupted to a greater or less extent. This because of refusal to receive the medicine, mental excitement, etc.; but from December 2 to 14 the treatment was in all cases suspended because of a failure of the supply of the drug.

To conclude, it may be said:

1. That in all the cases in which the drug

was given continuously there was noted a reduction in the number of fits, ranging from about twenty-five to seventy-five per cent., as compared with other months during which patients were on bromide and tonic treatments alternately.

2. The remedy was in all cases well borne, producing no apparent mental or physical depression. This in marked contrast with depressant effects noted after a course of bromide treatment.

3. No skin eruption was produced.

4. In any given case, in which a great number of fits are occurring, and where it is desirable to control them as soon as possible, the bromides would be of far more value than antifebrin.

VIBURNUM PRUNIFOLIUM AS A TEST FOR LABOR-PAINS.

By R. L. Hinton, M.D., Prescott, Arkansas.

HAVING read with great interest about all that has been written of this wonderful remedy, and having failed to see any mention of this, as I think, very important feature in its therapeutic value, I have thought that a brief report of my experience in this direction might be of interest to the profession. And I will only ask space to relate one case, which will show, in the best light and in the fewest words, what I want to communicate.

On December 11, 1888, I was called to see Mrs. W., aged 20, primipara, well proportioned and well developed. Her husband had engaged my services some months previously, and had told me that he would be after me about this time (see above date), said they had kept a correct count of the time, and were not mistaken, wanted me to bear in mind the date, and hold myself in readiness. Accordingly, he came, and, as he lived nine miles in the country, he insisted that we ride with all speed, for "he thought there was no time for swapping horses." We reached the place at about 10 P.M., found his wife apparently fully in the throes of labor, three or four of the neighbor-women on hand, including the patient's mother, quite a sprightly, intelligent old lady, with some obstetric experience. Their countenances all seemed to say, "Now, the doctor is here, she will soon get through, for surely all things are ready." As has been my habit for many years, I gave her a teaspoonful of tr. viburnum in a little water, and sat down to await results.

She was soon easy, and, in less than ten minutes, dropped into a quiet sleep. At eleven o'clock I went to bed, leaving instructions to repeat the medicine if the pains came on again, and, if necessary, to call me up. I was not disturbed, and found the next morning that she had rested well and was feeling much refreshed. I then had a talk with her and her mother, to ascertain, if I could, whether there was not "a mistake in their count;" and my conclusion was that she ought not to be confined short of six weeks, of which, I thought, I had convinced them before leaving. I left directions for the viburnum to be continued three times a day, without fail, and if labor should set up, to give it every two to four hours, according to the urgency of the case, and send for me. In just three weeks I was called again, and in haste, her husband, who came for me, assuring me that there was no mistake this time. I arrived about the same hour as before, asked when she had taken a dose of her medicine. The answer was about three days ago. How long had she been suffering? Over two days, and gradually growing worse. Asked her why she had not taken her medicine. She said the women told her if she continued to take THAT MEDICINE she NEVER WOULD have her baby." I gave her a teaspoonful of viburnum, as before, assuring her that if her pains were natural and right, or, in other words, true labor-pains, she would go on and get through in good time; but, if they were not, she would get easy, as before.

She got easy, as before, and I went to bed, leaving directions as on my previous visit. The next morning found her, as before, refreshed, by being relieved of a night's unnecessary torture, and blessed with a comfortable, quiet sleep. I had another conference with her and her mother, told them I was still of opinion she would go three weeks longer, that I was certain of two things,—first, that her full time was not up; and, second, that if she would stick to my medicine, as directed, she would not send for me again before she needed me. Looks, as well as words, told me they were slow of faith. I finally told them that if they had more confidence in what the women would tell them than in my judgment, and if they were not willing to carry out my treatment in good faith, I would be compelled to abandon the case, and they could get other help. This settled the matter. They (she and her mother) both prom-

ised that the medicine should be taken regularly until I was sent for again. I left, assuring them that if they *did this* she would get through, when the pains returned, promptly and naturally. So, in three weeks, less one day, I was called the third time, and found her pains bearing down, natural and regular, occiput presenting, and in three hours she gave birth to a fine large male child. The secundines came away promptly; no hemorrhage. She made a good and speedy recovery. I never have post-partum hemorrhage, nor severe after-pains, and scarcely ever use anything but viburnum. I consider it the best remedy for both these troubles that we have, and I never have, in my practice, puerperal fever or convulsions. I usually keep my cases on this medicine till they are able to get up and dress.

I could relate cases similar to the above by the score, and there are other things I would like to say about black haw, but this article is already too lengthy. I will only add that I make a saturated tincture from the green root, of which I use about five gallons in my practice annually. I scarcely ever find it necessary to remain with my cases longer than to see the child dressed, after the mother is cared for; and, out of thirty-three years' practice, I have only had three forceps cases; these were on account of disparity between the dimensions of the fœtal head and the pelvic outlet. Only one serious perineal laceration, one slight, both primipara.

POISONING BY HYOSCINE HYDROBROMATE.

By D. W. Prentiss, M.D., Washington, D.C.*

IN the February (1889) number of the Therapeutic Gazette are reported two cases of poisoning by hyoscine, which show this alkaloid to be a powerful and uncertain drug.

In one case, $\frac{1}{75}$ of a grain was given hypodermically to a man weighing two hundred pounds, and was followed by most active and distressing poisoning.

In the other case, $\frac{1}{75}$ of a grain was given hypodermically to a man, by mistake, and again alarming symptoms resulted. Both patients recovered the same day without bad results.

In the case here reported, $\frac{1}{100}$ of a grain of hydrobromate of hyoscine (tablets of Sharp & Dohme, of Baltimore) was given hypodermically, at 11 A.M., to a delicate woman, about 28 years of age. She had been accustomed to taking morphine and atropine in the same way for the relief of severe pain in the cervical spine, and on this occasion hyoscine was substituted, without her knowledge, in the hope that it might take the place of the morphine, of which there was danger of forming the habit.

In about three minutes after the drug was given dryness of throat and mouth was felt, face was flushed, and a very nervous, quivering sensation felt all over the body. The rush of blood to the head continued until the face was nearly purple. Sight was dim, pupils dilated very much, and patient seemed aware that she had taken some new remedy, asking, "What was given me?"

In a short time delirium occurred; she cried bitterly, seemed very nervous, and insisted upon sitting up in bed, though her efforts to do so proved her too weak.

In half an hour's time limbs seemed torpid; could only raise her hand with great difficulty; eyelids were so stiff that she could not close them. Nausea felt in twenty minutes after taking the drug; continued several hours.

The patient complained of a sinking sensation, and those about her thought several times she was failing fast. Delirium nearly all the time; patient greatly depressed, and talking in a most despondent way, this being very unnatural for one of her cheerful disposition.

In the afternoon she seemed to be in a stupor, though roused at times and spoke. In five or six hours the effects of the drug seemed to wear off, and she was herself again, though very much weaker.

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NOTE ON THE DOSE OF IRON.

By W. W. Jaggard, M.D., Chicago, Ill.

THE topic that heads this paragraph is of greater practical moment than is at first apparent. Considerable difference, both of opinion and of practice exists upon the subject of the size of the therapeutic dose of iron. As a rule, quantities of the metal are

exhibited that are far in excess of the needs of the body, and far above the amount that can be absorbed. Thus Goodell, although commonly a very judicious prescriber, urges the exhibition of Blaud's pill in the following liberal way:

"During the first three days one pill is to be taken after each meal. On the fourth day, four pills are taken during the day. On the fifth day, five pills; on the sixth day, six,—that is to say, two pills after each meal. For three days more, six pills are taken daily; then the dose is to be increased by one pill daily, until three pills are taken after each meal. On this final dose the patient is kept for three or four weeks, as the case may be. In stubborn cases I have occasionally run up the dose to the number of five pills thrice daily, and have seen no other bad effects from it than a feeling of fulness in the head." *

How much metallic iron is thus introduced into the patient's alimentary tract? Blaud's pill, according to Goodell's formula, is composed of 2½ grains each of dried ferrous sulphate and pure potassium carbonate. If we assume the molecular weight of the iron salt to be 170, each pill will contain .82 grain of the metal. When the patient takes 1 pill after each meal, she receives daily about 2½ grains of metallic iron, and when the final dose of 3 pills after each meal is reached, she ingests nearly 7½ grains.

Now, anæmia is the chief, if not the only, indication for iron in the class of cases in which the mode of administration just outlined is advised. But in anæmia, iron, so far as we know, is a food rather than a medicine, since it is supposed to be an essential constituent of hæmoglobin and therefore a necessary integrant portion of the red blood corpuscles. If iron simply acts the part of a food for the red blood disks, its *rôle* is limited. The quantity exhibited must bear some relation to the actual needs of the red blood corpuscle.

The amount of iron present in the red blood corpuscles under conditions of health is a determinate quantity. It has defined limits that are by no means wide. Modern physiology teaches us what these limits are. Professor McKendrick,† in his "Address in Physiology" writes: "The blood of a man of average size may be taken at 4536 grammes, or about 10 pounds. Such blood contains about 13.083 per cent. of hæmoglobin, or about 1¼ pounds. As regards the iron, 100 grammes of blood contains .0546 gramme. It follows that the total amount of 4536 grammes contains about 2.48 grammes, or nearly 39 grains." It is obvious that under the daily exhibition of 3 of Blaud's pills—about 2½ grains of iron—a quantity of the metal is soon introduced into the body that is equal to the amount normally present in the total blood-mass. Under the daily administration of 9 pills,—nearly 7½ grains of the metal,—the final dose that is to be continued for three or four weeks, the saturation point may be reached within a very few days.

To establish a valid objection to this continual overdose of iron, it is not necessary to prove direct injury to the individual from the use of the method. It is quite sufficient to show that these large doses are not necessary. As a matter of fact, the surplus of the drug passes out of the alimentary tract along with the fæces, and does comparatively little harm aside from the occasional disturbance of an already enfeebled digestion.

Overdoses of iron are more common when the tincture of ferric chloride is used as the chalybeate. Twenty-five minims of this preparation contain about 1 grain of metallic iron. Under the enormous doses of this remedy that are so often prescribed, the saturation point is usually passed much sooner than in the case of Blaud's pills.

* "Lessons in Gynæcology," p. 151. Philadelphia, 1887.

† Fifty-sixth Annual Meeting of the British Medical Association, Glasgow, 1888 (*British Medical Journal*, August 18, 1888)

A CASE OF SPONTANEOUS COMBUSTION IN MAN.

By Floyd Clendenen, M.D., La Salle, Illinois.

DR. G. A. STOCKWELL, of Port Huron, Michigan, writing in the Therapeutic Gazette for March on "Spontaneous Combustion of the Human Body," called to mind a peculiar case which came under my observation while coroner of La Salle County, Illinois. I will give the facts, and then leave it to the judgment of those who may be seeking evidence *pro* and *con* on this subject, upon which we have all read "but knew no more."

On Christmas morning, 1885, I was telephoned to go to Seneca, a village in the eastern part of the county, to hold an inquest on the bodies of Mr. and Mrs. R., who were

found dead in their farm-house, near said village.

I immediately got on a train, and in due time was at the scene of disaster, where I found a large crowd of curious spectators. I at once empanelled a jury of the most intelligent citizens, one of whom was an M.D., and proceeded to investigate. The first thing that attracted our *particular* attention was the peculiar sickening odor which pervaded everything in and about the large frame farm-house where the accident occurred. The inner walls of the house and the furniture were heavily coated with a dirty, greasy, sooty substance. We found the house was occupied the night preceding by Mr. R.and wife, an aged couple of Irish people, who were both—more especially the old lady—addicted to the excessive use of whiskey, and an old Swedish man, who was almost an imbecile and *perfectly* harmless. The latter invariably got up at five o'clock, but on this occasion he did not arise until near eight o'clock, and was scarcely able to give the alarm to neighbors near by owing to his being nearly asphyxiated in his room, which was in the upper portion of the house and the doors closed between. He died two weeks later from the effects of the poison inhaled that night, as supposed.

On entering the house we found Mr. R. lying dead on the floor by his bed, adjoining the kitchen, his room-door being ajar. In the kitchen we found the furniture all in its usual place. A tallow candle on the table, one-third burned, appeared to have been extinguished by Mrs. R., as it was her custom to be the last of the household to retire. (They did not use anything but common candles for illuminating the house.) We found a hole burned in the kitchen floor (which was made of inch pine boards) two feet six inches by about three feet square, the earth being about two feet below the floor. Eight feet from this hole in the floor was the kitchen range, in which, subsequent proof showed, the fire had gone out at 8 P.M. on the 24th, or night of the accident. Upon examining the opening in the floor we discovered a mass of cinders on the ground beneath. Upon removing them, we found the skull, the cervical, and half the dorsal vertebræ reduced very nearly to a cinder, also about six inches of the right femur, together with part of ilium in about the same state as the vertebræ. The feet were found in the shoes; the left foot was reduced to a cinder, the shoe being partially calcined. The other foot and shoe were reduced to a complete cinder. The other parts of the body and clothing were reduced to a *very light* cinder, leaving *no* shape of former body. The clothing entirely gone. Upon removing, the entire remains of Mrs. R., who a few hours previous had weighed one hundred and sixty pounds, were now placed in a box that would hold less than one bushel, The entire remains weighed twelve pounds. The evidence disclosed the fact that Mrs. R. had been an habitual drinker, had drank more than a quart of whiskey during the previous day, was intoxicated when last seen alive, at 8 P.M. It appeared as if Mrs. R. had burned on the floor without a struggle, but why the floor did not continue to burn is a mystery. The pine joist against which the remaining cinders lay were slightly charred, but not burning when found.

There was not any evidence of a blaze having occurred. The skull and hip bone were really the only evidence by which it could be told that a human body had been cremated there.

ADDITIONAL NOTE ON THE TREATMENT OF YELLOW FEVER.

By Geo. M. Sternberg, Surgeon U.S.A.

I WISH to add the following postscript to my paper on the treatment of yellow fever:

I have just received a letter from Dr. Reuben Cleary, an American physician practising in Rio, in which he says, "In all I have treated thirty-four cases of yellow fever, all of them genuine, but as about one-half did not present albumen in the urine nor 'black vomit,' they might be contested, yet they all began with sudden chilliness, then excessive temperature, mostly with dry skin (temperature, 39.9° to 40.5°), which lasted from twelve to seventy-two hours, abating somewhat; tongue whitey yellowish, skin yellow, great hyperæmia of the thoracic integument, some diminution of the urine, gastric uneasiness, and vomiting. In my opinion and that of an experienced Brazilian physician they were undoubted cases of yellow fever. Of the *thirty-four*, I lost only *one*,—that is the one I wrote you about,—and in every case I used your formula steadily throughout. In one case I gave 3 litres. I found it better to use 3 centigrammes of the mercuric bichloride, and gave it in ℥i-doses ice cold. I also controlled the heat with antipyrin or

antifebrin, and gave appropriate medicaments for gastric and other symptoms as they presented themselves."

I also wish to correct the following mistakes in my paper, as published in the THERAPEUTIC GAZETTE of May 15:

Page 299, second column, eleventh line from top, for *29 22* read *22.72*.

Page 303, second column, in the formula, as prescribed by Dr. Sollace Mitchell, for "aquæ puræ, ℥iv," read aquæ puræ, ℥iv.

HAVANA, May 12, 1889.

ON THE TREATMENT OF WHOOPING-COUGH BY ANTIPYRIN.

Coincidently with the progress which has been effected of late years in the etiology of the infectious diseases, there has been progress in therapeutics, but not equal progress. It might have been expected that of all these diseases, among the first to profit by the new etiological acquisitions would have been pertussis and diphtheria, diseases in which, according to the microbiologists, the infectious germs have a primary localization in parts fairly accessible; it cannot, however, be said that the antiseptic treatment of these diseases has yet achieved brilliant success. Hippocrate Callias, it is true, claims remarkable results in diphtheria from sprays of resorcine, while Gaucher and Dubousquet think they have saved nearly all their patients by local applications of very strong solutions of phenic acid. But the communications of all these gentlemen were received with no little incredulity when read before the learned societies, and certainly many other excellent authorities who have thoroughly tried the local germicide treatment, while awarding to antisepsis in diphtheria high praise, speak guardedly and by no means boastfully of the results which they have attained.

So with regard to whooping-cough, Ollivier, physician to the Enfants Malades, in the *Bulletin Général de Thérapeutique* (March 30, 1889), testifies to the generally unsatisfactory results of the germicide therapy of this disease. Tar vapors and turpentine vapors have been tried, and fumes of sulphurous acid, while phenic acid sprays have been used day and night; so, also, creoline, resorcine, petroleum, quinine, and benzoate of sodium in pulverizations; but this topical medication, however faithfully carried out, has never, says Ollivier, shortened the duration of whooping-cough by one day, nor has it ever markedly alleviated the paroxysms of coughing, or prevented any of the complications. It is impossible, he asserts, to charge the air of inspiration with a sufficient quantity of any antiseptic agent to destroy the pertussoid germs burrowing in or beneath the epithelium of the laryngeal mucosa. Better than all antiseptics, he says, is change of air; oxygen is itself a parasiticide.

Despairing of successfully meeting the casual indication, Ollivier would content himself by treating symptoms and complications, and especially by quieting the hyperexcitability of the vagus centre by means of nerve sedatives. He has nothing very new to offer for the accomplishment of this end. He speaks favorably of antipyrin.

At a recent meeting of the Société de Thérapeutique, Dubousquet-Laborderie read an interesting paper on the treatment of whooping-cough by antipyrin. He has treated ninety-four cases with general success; he claims that the duration of the disease in the majority of these patients was markedly shortened. The sedative effects of the medicine on the cough-paroxysms were perceptible from the very first. In seventy-one of Dubousquet's cases, the average duration of the disease was twenty-four days, instead of forty-four to fifty, which is the ordinary duration. He accepts Trousseau's definition of pertussis,—"a specific pulmonary catarrh with neurosis,"—and believes that antipyrin benefits this disease by addressing itself to the two elements,—*specificity* and *neurosis*. As the nervous or convulsive element predominates in pertussis, it is probably chiefly by allaying hyperexcitation and spasm that it does good. One remarkable effect of the antipyrin treatment was the diminution in the number of pertussoid paroxysms,—*i.e.*, from twenty-five or thirty fits of coughing a day to half that number, or even less. The intensity of the paroxysms was also greatly abated.

The doses prescribed by Dubousquet vary from five to fifteen grains per day to children under three years of age, and from twenty to sixty grains a day to older childern and adults. To a child of five years of age, a 5-grain dose may be given after each fit of coughing till three or four doses have been taken. To an adult, the dose may be twice as great. The medicine may be given in raspberry sirup and Vichy water. He prefers to begin with full doses, which may be increased or diminished, according to the indications.—*Boston Medical and Surgical Journal*, May 16, 1889.

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Leading Articles.

THOUGHTS ON URIC ACID.

THE question of uric acid in its relations to urea, to food, to drugs, and to disease is one of such importance that we need no apology for referring to the work of Dr. A. Haig in his thesis for the degree of doctor of medicine in the University of Oxford, 1888, and in the sundry other publications since; see especially "St. Bartholomew's Hospital Reports," vol. xxiv. The theory which A. Haig especially puts forth, and which he claims to have substantiated by a large series of experiments, teaches that the formation of uric acid has a normal relation to that of urea (the relation being as 32.6 to 1), and that this normal relation is constant in health, in disease, under all diets, and all medications. He believes that a diet, a medicine, or a mode of life, or a morbid process which increases or decreases the production of one of these principles, alike increases or decreases one or the other; but that certain dietetic substances, medicines, habits of life, disease, or diathetic conditions have the power of checking, not the formation but the *excretion* of uric acid, and thereby causing the storing of uric acid in the system, which urid acid in turn becomes a source of irritation and disease; and, further, that this uric acid, when heaped up in the liver, spleen, or other organ or tissue, causes a local disease; but when swept out into the alkaline blood produces general lithatemic symptoms, such as headache, hypochondriasis, epilepsy, neuralgia, etc.

If the theory of Dr. Haig be correct, exercise, alkalies, or other procedures which cause a liberation of uric acid that has been stored up in the tissues, and a solution of it in the blood must at first increase all symptoms which are due to the presence of uric acid in the system. As the result of his clinical experience and experiments our author even goes so far as to affirm that at least in some cases epileptic explosions, and even acute mania, have been the result of a setting free of uric acid that had gradually accumulated in the system. The central idea of the thesis of Dr. Haig, the asserted constancy of the relation between the formation of uric acid and urea in the system, under all circumstances, is, to us at least, a novel one. Sometimes gouty people seem to be worse at first after the change of their habits of life, a result readily explainable by the theory of Haig. On the other hand, we have never yet seen a patient in whom there was a primary increase of the symptoms of a gouty diathesis produced by the exhibition of salicylic acid. We are, therefore, not as yet prepared to admit the truth of the theory, especially as it seems to be against the general teachings of physiological chemistry. The relation of uric acid to urea is not yet thoroughly established, but we believe most authorities incline strongly to the view that the acid is—what the Germans call a *Vorstoff*— a product in the formation of urea,—*i.e.*, a material which has undergone partial degradation, but has not yet reached the urea stage. If this be correct, it seems to us entirely improbable that neither food, nor medicine, nor life-habit should have the power of checking midway the process which eventuates in the production of urea, and thereby causing an increase in the formation of uric acid.

However much of truth or of falsity there may be in the chief theory advanced by Dr. Haig, some of his minor generalizations, based upon his own chemical work, are very interesting. He has found that an increase in the acidity of the system diminishes uric acid excretion. The acidity of the system may be increased by the administration of acid or by

administration of certain foods. Those foods which increase acidity, according to our author, diminish uric acid excretion, and those which diminish acidity increase uric acid. Foods may increase acidity by the acid or acid salts that they contain, or by causing dyspepsia and acid fermentation in the gastro-intestinal contents, or they may diminish the acidity by the alkali which they contain.

The iodide of potassium Dr. Haig found, when given in large doses, to act like an alkali, increasing the general alkalinity of the system, and also the excretion of uric acid. Phosphate of sodium in most of his experiments notably increased the excretion of the acid; in some of them it diminished the excretion, but in all of these cases it was found by chemical analysis that the alleged pure phosphate contained a considerable amount of the sulphate of sodium, and the sulphate of sodium was found to have a remarkable power in lessening the excretion. Iron also lessened excretion; a fact which seems to account for the headaches which iron is very apt to produce in gouty subjects. Lead also diminishes the uric acid output; this, in turn, seems to explain the rare cases in which plumbism or chronic lead-poisoning has for its chief manifestation gouty joints and gouty arteries; we have certainly seen podagric symptoms, not to be distinguished from those of ordinary gout, produced by lead.

In regard to alcohol, Dr. Haig seems to believe that it is not so much the alcohol in the wine, ale, or porter which causes gouty manifestations, but the acids which these beverages contain, or which they are liable to produce in the alimentary canal. The salicylates augment the excretion of uric acid most remarkably, their power being such that they are able to dominate almost every substance which decreases excretion, so that, in spite of presence of acids, the salicylates produce a great increase in the throwing off of uric acid.

Another point of some importance made by Dr. Haig, of which in practical therapeutics we perhaps do not think sufficiently often, is the failure of drugs to act on account of their failure to enter the system. Thus, in a case of epilepsy, related by Dr. Haig, on several occasions the urine gave no reaction with perchloride of iron during the fits, though on some occasions there was probably as much as twenty grains of the salicylate lying in the stomach, and there was a strong reaction in the urine voided after the fits had passed off, without any more of the drug having been given.

4

SALICYLATE OF MERCURY IN SYPHILIS.

THE neutral salicylate of mercury—a white, amorphous, tasteless, and odorless powder, scarcely soluble in alcohol and water, and having the formula $(C_6H_4OHCO_2)_2Hg$—was first introduced as a remedy in the treatment of venereal affections by Dr. Silva Araujo, of Rio Janeiro, who claimed for it that it had less influence upon the alimentary tract, and was better borne by the system, than any other preparation of mercury, and that its action in syphilis was exceedingly energetic and effective, so that it sometimes brought relief when the older preparations of the metal had failed. The publications of Araujo were followed by a number of papers from Brazilian physicians, and also attracted attention in Europe. In 1887, Szadek, of Kiew, especially commended the remedy as an injection in cases of gonorrhœa, employing the following formula:

Hydrargyri salicylatis, .10 (gr. iss);
Aquæ destillatæ, 250 (℥viss);
Sodii bicarbonatis, 1 to 1.3 (gr. xv to xx). M.D.S.

He also gave details of twelve cases in which he had practised one hundred and twenty intramuscular injections of the salt with most excellent result. For this purpose he employed the following formula:

Hydrargyri salicylici, .2 (gr. iii);
Mucilag. gummi arabici, .3 (♏x);
Aquæ destillatæ, 60 (℥iss). M.D.S.

He gave the injections at intervals of two or three days, and repeated them from six to twelve times in an individual case. He especially affirmed that the salicylate produced, when injected under the skin, absolutely no disagreeable local manifestations.

Dr. Epstein, of Nürnberg, in experiments in which he injected upon one side the salicylate and the other calomel, found that the salicylate was much less apt to produce local symptoms than was the other mercurial.

Dr. Arthur Plumert, of Prague, did not obtain extraordinarily good results in gonorrhœa with the injections of salicylates; but, on the other hand, confirms its value in the treatment of syphilitic troubles; especially does he commend its hypodermic use. In not one of the twenty-four patients upon whom he employed these injections were there any local symptoms, but in one case stomatitis followed.

Drs. Jadassohn and Zeising, assistants of Professor Neisser, of Breslau, employed a

ten per cent. solution of the salicylate in a pure liquid paraffine, and treated one hundred and forty-one patients with four hundred and forty intramuscular injections. In forty-five of the patients there were slight local symptoms, and in four cases these symptoms were somewhat severe. In all cases the effect upon the specific disease was very rapid and pronounced.

Professor Neumann, at Vienna, has employed with satisfaction the salicylate internally in the form of pills in twenty recent, and one old, cases of syphilis. He also in eleven cases used the hypodermic injections without ever noticing any local irritation.

In a recent thesis upon the subject, Theodore Schreus reports a number of cases which have been treated in the clinic of Doutrelepont with hypodermic injections of a ten per cent. suspension of the salicylate in paraffine, the size of the injections being such that the patient received each time 1½ grains.

The whole list of reported cases in which the mercurial salicylates has been employed intramuscularly amounts to two hundred and nineteen, with fifteen hundred and eighteen injections, and there seems to be a general consensus of opinion as to the value of the method and the freedom of the preparation from irritant properties. This record would seem to be sufficient to demand a careful study of this preparation by American syphilographers.

DEVENTER'S METHOD OF DELIVERING THE AFTER-COMING HEAD.

A HOPEFUL sign of the times with us is presented in the increased interest in the advancement of the science and art of obstetrics. Hopeful, since during the last ten or fifteen years attention has been largely concentrated upon the maladies peculiar to the non-pregnant female. This indication is all the more gratifying since it implies the ultimate limitation of certain modes of pernicious activity in gynæcology so-called.

Parvin* has recently made a forcible appeal for the more exact study of obstetrical operations. Now, while his plan is totally impracticable in our large metropolitan schools, on account of the size of the classes and the brevity of the term, still every member of the profession must commend his words. Volume ii. of the "Transactions of the Ninth International Medical Congress" also bears evidence to the revival of obstetrical learning in the United States. For the first time in the history of the Congress, there appears a section (iv.) that is devoted to midwifery. This division of gynæcology into two departments is to be regretted, since the subject is essentially unitary in character, yet, as the crude expression of renewed interest, it is ground for congratulation. Many of the papers, published in this volume under the "Section of Obstetrics," must be regarded with charity, not so much for their intrinsic value, but as the sign of a general awakening to the fact that midwifery has been sadly neglected of late.

Out of the numerous contributions several may be selected of uncommon merit. One of the best of this class bears the caption, "A Study of Deventer's Method of Delivering the After-coming Head," by John Bartlett, M.D., Chicago. It is the object of this paragraph to present the outlines of this paper, and to add a word or two in criticism.

The following sentences descriptive of the method have been collected by Dr. Bartlett from several passages in Deventer's book:

"The infant, being turned gradually till it lies with its belly downward, is extracted till he is out above half-way, and then it is time for the woman to labor, as we have elsewhere shown; for now the head and arms are to pass through at once, and though all authors that I know of teach the contrary, requiring that the arms be extracted one after another and should be placed along the body, yet I both think and have found the contrary. Wherefore, I positively advise that the arms be left about the head, to be extruded along with it. I confess that the woman is obliged to force the infant with all her endeavors, but, like a small cloud, 'tis soon over. I most commonly prevent the woman from having pain till the infants are come so far (half-way out), then, allowing a little rest and encouraging her, I positively promise that if she performs her part courageously the birth will be presently performed; only for that purpose she must use all her strength to bring the infant forth, behaving herself as if the pains were pressing; pressing down with all her force; which, if you see the woman doing, she must be faithfully assisted by drawing the infant downward and with force, yet cautiously. I say downward, not upward; not according to the woman's length, as most midwives used to do, but downward towards the intestinum

* Address before the American Academy of Medicine, 1888.

rectum; otherwise the infant would be wedged in tightly, and it could not shoot through easily. The greatest care should be taken that the head and arms pass together, which may be done commodiously and without danger to life, after the manner mentioned."

It is from Smellie, however, that we receive a more exact description of the procedure, at well as some notion as to the indications for the operation. Smellie writes: "Deventer and others have directed us to press the shoulders of the child downward, so as to bring the hind-head first from below the os pubis. . . . When the forehead is hindered from coming down into the lower part of the sacrum by an uncommon shape of the head or pelvis, and we cannot extract it by bringing it out with a half-round turn at the os pubis, we must try to make Deventer's turn in the contrary direction, and, instead of introducing our fingers into the child's mouth, let the breast of it rest on the palm of your left hand (the woman being on her back), and, placing the right on its shoulders, with the fingers on each side of the neck, press it downward to the perineum. In consequence of this pressure, the face and chin, being within the perineum, will move more upward and the head come out with a half-round turn from below the pubes; for the centre of motion is now where the fore part of the neck presses on the perineum."

The advantages claimed for Deventer's method by Dr. Bartlett are:

1. What Barnes might call the decomposition of the wedge of the shoulders; in lieu of the bis acromial diameter presenting at the superior strait, it is the bis-axillary diameter.

2. The arms, extended upon the head, bridge over the space between it and the body; thus extended, they (*a*) act as fenders for the cord, keeping open channels, through which the funis may pass uncompressed; (*b*) they antagonize that spastic contraction of the uterus, which, closing in upon the lower circumference of the after-coming head, is one of the causes of fatal delay in delivery in these cases.

3. By this method the delivery of the after-coming head is very greatly simplified. In the majority of instances it may be unnecessary to interfere with the attitude of the head. Deventer claims that, with few exceptions, the head will "shoot through" both straits easily.

4. The delivery by extension is very much more expeditious than the ordinary method. Precious time is not lost in bringing down the arms, inserting the fingers in the child's mouth, etc. As a consequence, if the experience of Deventer is to be relied upon, it would seem to be safer for the mother, and very much safer for the child, than other methods.

The cases, in which Deventer's method has been tried within recent years by Dr. Bartlett and others, are too few in number, and, also, too imperfectly described to add much to or to detract seriously from the value of the procedure. The only instance of an accurately recorded case that has come under our observation is contained in the paper read by Dr. J. H. Chew before the Chicago Medical Society, December 27, 1888.* At present, then, the value of Deventer's method rests largely upon theoretical claims.

Let us inquire into the nature of these alleged advantages as they have been formulated by Dr. Bartlett.

Turn for a moment to the normal mechanism of the delivery of the thorax and head in either natural or artificial breech presentations. Select, for example, the first position. The shoulders, with the arms in their normal attitude,—*i.e., the arms to the sides of the chest, the forearms crossed over the anterior thorax,*—pass the os uteri and the superior strait in the left oblique diameter. Under favorable conditions, when the resistance of the pelvic walls and floor is encountered, the left shoulder is rotated from right to left, while the right shoulder is rotated from left to right, until the bis-acromial diameter of the fœtus is coincident with the antero-posterior diameter of the pelvic outlet. The thorax is born with the arms still in the same relative habitus. Wiedemann, Velpeau, Desormeaux, Madame Lachapelle, and Hodge have all ably maintained this doctrine with reference to the attitude of the arms, in opposition to the notion, countenanced by Baudelocque, "that the arms will remain elevated along the sides of the head in pelvic deliveries." It seems to us that Dr. Bartlett is inclined to Baudelocque's view, erroneous though it is.

The head enters the superior strait with its long diameters coincident with the right oblique diameter. The normal attitude of the head under these conditions is that habitus in which the chin is flexed upon the sternum. As the head passes through the pelvis, flexion is increased, so that, as aptly

* Transactions of the Chicago Medical Society, December 27, 1888, p. 15 (*Supplement* to *Western Medical Reporter*, February, 1889).

described by Hodge,* "When the process goes on naturally, there is a *presentation of the small extremity* of the ovoid of the head, which involves the important fact that we have the same short diameters of the head concerned as in presentations of the vertical or greater extremity of the head. For it follows that when the chin is towards the centre of the os uteri, or superior strait, it points towards the coccygeal region, and therefore the posterior fontanelle, or vertex, points to the fundus of the uterus. Hence the occipito-mental diameter is coincident with the axis of the uterus and that of the superior strait."

Responsible opinion is unanimous upon the point that the normal mechanism, here outlined, offers the most expeditious mode of delivery, while, at the same time, it involves the minimum degree of danger to the perineum.

It follows that the method of extraction is best that imitates most exactly the natural mechanism of labor. Now, obstetricians the world over, whose opinions are at all authoritative upon the point, unite in the concession that the so-called Smellie-Veit method patterns most closely after the natural mechanism. This method consists in the liberation of the shoulders, and in the extraction of the head by traction applied over the shoulder-girdle, while the chin is flexed by the finger applied through the mouth to the lower jaw. As pointed out by Winckel,† the present appellation is a misnomer, since the method was described by Mauriceau in 1668, and perfected by Lachapelle in 1821.

If we accept the proposition just stated, —and assent cannot justly be withheld,—we must reject the "particular advantages" (3 and 4) respectively claimed by Dr. Bartlett. Dr. Knox's query is certainly pertinent: "Why should we provoke a malposition, and then hunt for a new method of delivery?"

As regards advantage No. 1, the wedge of the shoulders is not decomposed; it is only reversed in direction. No mechanical advantage whatsoever is gained.

Advantage No. 2 seems so highly hypothetical, even fanciful, that it scarcely deserves serious consideration.

Deventer's method is of undoubted value in certain exceptional cases, the nature of which has been pointed out by Smellie. When, for any reason, the arms cannot be liberated with ease, when the chin is extended and cannot be flexed, after the failure of the more reliable procedures, there is presented a plain indication for the use of Deventer's method.

Dr. Bartlett's paper is of greatest interest from quite a different point of view than that of utility in practice. The essayist was enabled to unearth the Dutch obstetrician's secret only through the careful reading of Smellie's works, proof, as remarked by Professor Simpson, of the importance of the relative study of the works of contemporary writers. The paper is a typical example of patient research into the wisdom of the ancients. This field of archæological inquiry has found but little representation in the medical literature of the United States, and a contribution of the nature of Dr. Bartlett s is necessary to prove the versatility of the national mind. But, inasmuch as we fail to perceive the great practical value of Deventer's method, we cannot regard Dr. Bartlett's discovery as an instance of the truth of the apothegm, "Time is like a river, which has brought down to us things light and puffed up, while those which are weighty and solid have sunk."

* "A System of Obstetrics," p. 171. Philadelphia, 1866.

† *Lehrbuch d. Geburtshülfe*, p. 684. Leipsic, 1889.

ANTIPYRIN IN DIABETES.

IF one could believe all that has been written about antipyrin, it certainly could claim the title of "universal panacea," for there is scarcely a disease for whose relief or cure some claim has not been advanced for antipyrin. In 1887, Dr. Gonner (*Correspondenzblatt für Schweizer Aerzte*, No. 19, 1887) first suggested the use of antipyrin in diabetes, and his experiments have been followed up by Dr. Huchard, Robin, Germain Sée, and Panas. On the 13th of February, 1888, Dr. Huchard called attention before the Société Médico-Pratique de Paris to the marked effects which he had obtained from antipyrin in the treatment of polyuria and diabetes mellitus. One month later (*Revue Générale de Clinique et de Thérapeutique*, No. 7, 1888) he returned to this subject in reporting a case of diabetes insipidus in which the regular employment of this medication had reduced the daily amount of urine from twenty-four to three litres; at the same time referring to an observation on a diabetic patient in whom the enormous quantity of seven hundred and fifty-three grammes of sugar evacuated daily was in a few days reduced to two hundred and

seventy-one grammes, the urea being reduced from ninety-six to twenty-six grammes. Dr. Huchard was lead to the employment of this drug from its marked action on other neuroses of medullary origin, and he recognizes that all cases of diabetes are not amenable to this treatment. These results of Dr. Huchard attracted little attention until recently, when the entire session of the Academie de Médecine, April 9, 1889, was devoted to the discussion of this subject.

M. Panas (*Le Progrès Médical*, April 13, 1889) reported that he experimented on two cases of diabetes, and that they appeared to show in the most incontestable manner the power possessed by antipyrin for reducing the excretion of sugar. 3 grammes (45 grains) only of the remedy caused the entire disappearance of sugar from the urine; while glycosuria appeared as soon as its administration was ceased or the dose was diminished. According to Panas, the use of antipyrin will permit the employment of moderate quantities of starchy food, and has, in his hands, succeeded, even when absolute diet and various other remedies had failed to reduce the quantity of sugar.

Germain Sée stated that he could report eighteen similar observations in which antipyrin even served to completely suppress the excretion of sugar, at the same time reducing the quantity of urine, even when the starchy diet was persisted in. If, however, more than one hundred grammes, or one hundred and fifty grammes, of sugar per litre were excreted, or if the patients were phthisical, antipyrin proved inactive.

Dujardin-Beaumetz stated that more than a year ago he had recognized the value of antipyrin, and that all the substances belonging to the same series as antipyrin possessed likewise antiglycogenic properties.

Robin, on the other hand (*Gazette Médicale de Paris*, April 13, 1889, and April 20, 1889), is more guarded in his conclusions. He writes that, since October, 1887, he has treated a large number of cases of diabetes with antipyrin, of which four are published *in extenso*, and he concludes that antipyrin is a remedy which, while energetically reducing glycosuria, has, in his experience, never cured a case of diabetes. Nevertheless, while a cure has not been produced, it has reduced secretion of sugar and the thirst in polyuria, with improvement of the general condition of the patient. He has tested its use in various doses; 75 grains he has found to be too much, as it rapidly diminishes the appetite and is liable to produce serious albuminuria. With 60 grains the results are somewhat more satisfactory, although 45 grains is the better dose, except when the case is complicated by albuminuria, in which case he has found that 30 grains may be administered with some advantage, without increasing the amount of albumen eliminated. He recommends its combination with bicarbonate of sodium in the proportion of 1 part of the bicarbonate to 2 parts of antipyrin. Dr. Robin cautions against the habitual use of this remedy, stating that its use should not be employed in more than eight to ten doses, otherwise albuminuria may be produced, and so add a new drain on the already enfeebled nutritive process of the patient. The administration of antipyrin should thus be suppressed as soon as the excretion of urine reveals the least trace of albumen. In spite of this warning, Dr. Robin, nevertheless, believes that in albuminuric diabetes the dose of 30 grains of antipyrin may be employed without danger. Dr. Robin finally formulates his therapeutic conclusions as to the cases in which the employment of antipyrin is advisable somewhat as follows: Given a patient who is daily passing a large quantity of urine and large amounts of sugar, it is evident that with strict diet the glycosuria may be reduced, but this requires time, and is a great demand on the energy of the patient. In such cases it is highly advantageous to commence treatment by administering antipyrin for about a week without restricting the diet. The sugar, then, being considerably reduced, the patient may be submitted to a regular antidiabetic diet, which, if it at any rate does not further decrease the sugar, will at least serve to keep the state of affairs stationary. Again, when the diabetic patient, wearying of his monotonous fare, demands some relaxation of his diet rules, after the release antipyrin may again be administered for a week with advantage. It would thus appear that at the outset of treatment in case of diabetes mellitus, antipyrin will rapidly, though temporarily, reduce glycosuria and polyuria. It will permit through its employment relaxation of diet rules, and, by an alternative combination of the use of antipyrin and diet, the best attainable results of treatment in this disease are reached. If antipyrin does not at once produce reduction in the amount of sugar, it is useless to continue its employment; while, if the appetite diminish, feebleness, paleness, puffing of the eyelids, or sensation of tension in the face appear, all these are symptoms

which demonstrate that the use of antipyrin is more harmful than valuable. Dr. Worms, on the other hand, thinks that no more improvement will follow the use of antipyrin in diabetes than from a large number of other remedies, or even any change of treatment. Thus, he claims that quinine has been found quite as effective. Arsenic will succeed better and may be longer tolerated, and so will opium, valerian, and potassium bromide.

Finally, Dr. Kibbe, in the *New Orleans Medical and Surgical Journal* for May, 1889, reports a marked case of diabetes insipidus in which there was great reduction in the quantity of urine eliminated by the administration of antipyrin. 10-grain doses of this remedy were given every twenty-four hours, and the condition of improvement, which was very immediate, was maintained for over six weeks, when it is stated that the patient died from rapidly fatal diarrhœa.

SIMULO AS A REMEDY IN EPILEPSY.

IN the THERAPEUTIC GAZETTE for October 15, 1888, we published notes of the results obtained by Dr. Eulenburg through the use of simulo in cases of epilepsy, referring to the observations published in a previous number by Dr. W. Hale White on the same subject. In the *Medical Record* for May 11, 1889, Dr. M. Allen Starr publishes the report of seven cases, which, in the main, confirm the result of the other observers. He has found that the tincture of simulo has no effect upon the attacks of hystero-epilepsy or upon the hysterical state, nor does it modify the frequency and severity of attacks of petit mal or of procursive epilepsy. He finds, however, that it has some effect in modifying the frequency and severity of attacks of grand mal, but it is in this respect inferior to the bromides. About the only field of usefulness, therefore, for simulo would appear to be when for any reason it is deemed necessary to temporarily suspend the use of the bromides. No ill effects have been found by Dr. Starr to follow the use of the drug; no change in the rate or character of the pulse or respiration, no dilatation or contraction of the pupils, no muscular weakness, no mental depression or excitement, and no disturbance of the digestion in the doses in which it was used. We may repeat that the tincture employed is from the seed of the simulo plant (*Capparis corriacea*). The fruit, resembling a cherry, is about half an inch in length; the skin tough and brown; the body softer and green, and surrounding an almond-shaped pit with a white kernel. The kernel has a bitter taste, and it is from this that the tincture is made.

No attempt has yet been made to isolate its active principle, and it is possible that since practical experience proves that the use of this drug is not entirely without value in the treatment of epilepsy, that more encouraging results may follow the employment of its active principle should such a body ever be successfully isolated.

In the discussion which the reading of this paper evoked at the recent meeting of the New York Academy of Medicine, Dr. E. D. Fisher stated that while he had had no practical experience with the drug, simulo seemed worthy of a further trial, especially when combined with the bromides, although it appears that the effect of this combination had not yet been tested. Dr. L. C. Gray was rather inclined to believe simulo useless in epilepsy, since he tried it in several cases, both alone and in combination, and he had obtained from it no results except such as one could get in almost any case of epilepsy by changing the drugs employed. This was merely a temporary effect, and the same could be obtained by any one of almost a hundred other agents. He had, therefore, discontinued the employment of simulo, as it had, in his hands, proved so nearly useless as not to afford sufficient encouragement to give it a more extended trial.

PYRODIN AND HYDRACETIN.

AT the meeting of the Berliner Medicinische Gesellschaft, held May 1, 1889, Dr. Guttmann (*Prager Medicinische Wochenschrift*, May 8, 1889) reported some experiments made with hydracetin, the active principle of pyrodin or acetyphenilhydracin, the hydracetin being itself five times more active than pyrodin. It occurs in the form of a white, odorless, and almost tasteless powder, which is soluble in fifty parts of water, much more soluble in alcohol. Experiments on animals have shown that even in small doses this substance possesses marked toxic properties; 7½ grains introduced into the stomach or abdominal cavity of rabbits produce death within one day. Post-mortem examination shows that the inferior vena cava is filled with brownish-red blood; while the bladder is filled with a dirty, brownish-red fluid, which assumes a greenish-blue color with tincture of guaiac,

thus indicating abundant presence of the coloring-matter of the blood. The red blood-corpuscles have entirely disappeared; while sections of the kidney treated with hæmatoxylin show an enormous amount of detritus of blood-corpuscles in both the renal blood-vessels and urinary canals. Hydracetin, therefore, is a rapid reducing agent. Dr. Guttmann has employed it in cases of typhoid fever, pneumonia, phthisis, scarlatina, erysipelas, acute miliary tuberculosis, septæmia, and his experiments showed that hydracetin is a powerful antithermic. Administered in doses of 1½ to 2½ grains daily it produces within two or three hours a reduction of temperature of from 1½° to 2°, and in some instances even 3°. This reduction of temperature is, however, only transient, and after four or five hours the original temperature is regained. Hydracetin likewise produces diminution in the frequency of the pulse and respiration, with production of profuse secretion of sweat. Like other antithermic remedies, hydracetin controls the pains of acute rheumatism, but its action is only palliative and not curative, since it does not prevent relapse or extension of the disease to other articulations. Given, however, in the dose of 1½ grains daily in divided doses it causes remission of the pains for several hours. This analgesic action is explained by the fact that hydracetin is a reducing substance, belonging to the same class as pyrogallic acid. Employed in the form of an ointment of ten per cent. of hydracetin favorable action is produced in psoriasis; while it is also useful as an analgesic in cases of sciatica. Dr. Guttmann concludes that hydracetin may be freely used as an external application; while great care must be observed in its internal administration, since in three cases in which only 3 to 4 grains were given great paleness of the face was produced as an indication of the dissolution of the blood. As a consequence, he recommends that not more than 1½ grains should be given for a single dose, or, preferably, that only ¾ of a grain should be given at intervals of an hour. Even then the treatment should not be continued for more than three days.

At the meeting of the Société de Biologie, held May 4, 1889, Dr. Georges Lemoine (*Le Bulletin Médical*, May 8, 1889) likewise reported a number of researches made with this substance, employing, however, pyrodin instead of hydracetin, its active principle. He states that this substance (pyrodin) is a powerful antithermic, and gives better results than may be obtained from other remedies of the same class. He has employed it in tuberculosis, especially to combat the fever which accompanies the formation of pneumonic deposits. In doses of ¾ of a grain, pyrodin rapidly reduces temperature within an hour from 1° to 2½°, and it is necessary, to maintain this result, only to give this dose once daily to tuberculous patients. He even claims that this favorable action persists for many days, even after the administration of pyrodin has been suspended, and that it is only gradually at the end of from four to six days that the temperature regains its original height; sometimes it is asserted that this amelioration persists still longer. Besides this antithermic action, pyrodin is claimed to possess marked analgesic properties, and may be used with advantage in neuralgia, gastric pains, and the pains in the shoulders which are so frequent in tubercular cases. It is, moreover, stated that from its use night-sweats are relieved, and sleep becomes calm and more prolonged; in larger doses, pyrodin is toxic, and Dr. Lemoine advises that the dose given in one day should never exceed 1½ to 2½ grains; with 4 grains symptoms of poisoning are produced which resemble those occasioned by antifebrin,—cyanosis of the face and extremities, chills, reduction of the temperature, abundant sweats, acceleration, then slowing, and finally almost complete arrest, of the pulse and respiration, with final collapse, from which the patient may be rescued only with great difficulty. Certain cases have been found by Dr. Lemoine to be especially susceptible to pyrodin, and it should, therefore, never be employed unless carefully watched.

FREEZING OF THE SURFACE IN NEURALGIA.

IN a recent brochure, M. D. Debove, of the Hospital Andral, gives his experience with the therapeutic use of the chloride of methyl as a freezing agent in various diseases. He believes that the freezing acts somewhat after the manner of a counter-irritant. According to his experience, if the whole surface of the skin supplied by the sciatic nerve be very rapidly and superficially frozen, the results are almost miraculous, even in the most inveterate cases, the pain and the loss of power in the affected limb disappearing. In most instances repeated freezings are necessary for a complete cure; but usually after

three, four, or five applications a very pronounced effect is noted, even in the worst cases. In using the chloride of methyl it is essential that the territory frozen be widespread, and that the freezing be but momentary, since a persistent and very energetic freezing is liable to be followed by vesication or even sloughing. The effort is to act simply upon the surface of the skin. In females, according to the experience of Debove, vesication is especially easily provoked. Diabetes and albuminuria are considered by our author as contraindications to the use of the method.

M. Debove has also employed freezing in cases of facial neuralgia, and affirms that he has obtained a cure even in some cases in which the nerve had previously been cut by the surgeon, but in which, after four or five months, the pain had come back. In these cases it is often necessary that the freezing be performed daily for a long time, even for three months or more. Pigmentation of the skin is not rarely produced in sciatica, but the discoloration is asserted not to appear upon the face.

In Philadelphia, at least, freezing of the surface is not a new treatment in cases of rebellious neuralgia, as we have known the successful treatment of such cases in this manner. The first publication of the method, however, appears to remain with Debove, as he communicated his results as long ago as August, 1884, to one of the Parisian medical societies.

INHALATIONS OF CHLOROFORM IN DISEASES OF THE LUNGS AND HEART.

DR. M. ROSENBACH recommends inhalations of chloroform in small doses as a substitute for the too tardy or too prolonged action of narcotics, such as chloral, morphine, etc. (*Revue Générale de Clinique et de Thérapeutique*, April 25, 1889). Thus, when a patient is attacked with a paroxysm of pain, dyspnœa, or cough, which may last a quarter of an hour or half an hour, neither chloral nor morphine administered internally will suffice to produce relief, for before the medicine will produce its physiological action the crisis may have passed. On the other hand, a subcutaneous injection may, to be sure, produce an immediate action, but its effects are more prolonged than are required by the necessities of the case. In such cases the author recommends the inhalations of chloroform on account of the facility of adjusting the doses and in the possibility of producing a rapid action. Even the patient alone may regulate the dose, and in such cases as angina pectoris may produce relief without having to wait for the arrival of the physician. So also inhalations of chloroform, according to the author, may be used in asthmatic attacks of whatever nature, in dyspnœa in disease of the heart and lungs, in emphysema, in cardiac asthma, and in phthisical patients, where chloroform is much preferable to morphine in arresting irritable cough. Dyspnœa, due to pulmonary œdema, is not shortened by these inhalations, a fact which is not surprising when one recollects the marvellous action of injections of morphine in pulmonary œdema, in Bright's disease, and uræmic convulsions. Dr. Rosenbach likewise insists upon the palliative action of chloroform, or rather chloroform-water, as a local application in tuberculosis of the larynx.

Whilst abstracting and calling attention to the paper of Dr. Rosenbach, the editors of the THERAPEUTIC GAZETTE feel that they must give utterance to their belief that the practice discussed, especially the practice of allowing patients to give themselves chloroform, is an exceedingly dangerous one. One of the editors has had two personal friends, physicians, who have been found dead with a chloroform bottle by them under such circumstances as to demonstrate that the death was accidental and not intended. In angina pectoris the inhalations of nitrate of amyl are, we believe, much more efficient and much safer than those of chloroform.

In this connection we may call attention to a paper published by Dr. Stepp in the *Wiener Medizinische Blätter*, No. 9, 1889, in which the internal administration of chloroform is recommended in various affections. Dr. Stepp bases his views as to the administration of chloroform on the results obtained some time ago by Salowski, who found that the addition of a few drops of chloroform prevented putrefaction in readily decomposable fluids, and that cholera cultures, mixed with an equal quantity of chloroform-water, were entirely disinfected after one minute. This suggests the possible value of chloroform-water administered internally in cholera. Dr. Stepp found that an extremely favorable result followed the administration of chloroform-water in cases of gastric ulcer, the gastric pain ceasing and the vomiting being arrested; the results being attributed by the author to the disinfectant, astringent, and anti-hemorrhagic properties of the chloroform. In dyspnœa the chloroform-water internally was without

value. He, however, refers to six severe cases of typhoid fever in which the internal administration of chloroform was followed by the happiest results. Sixteen minims were dissolved in five ounces of water, and this given in three parts every day; its administration being followed in a few days by a great reduction of temperature and disappearance of all typhoid symptoms. It is claimed that in this dose chloroform does not act as a sedative, but as a stimulant.

LIABILITY TO DAMAGES FROM DEFECTIVE DRAINAGE.

IF the city authorities allow a sidewalk to be in such a condition that the passer-by falls and receives bodily harm, such passer-by readily obtains through the courts pecuniary recompense. If a landlord permits, even through ignorance, a weak cellar-door to remain, and the occupant of the house or a child in the street is injured in consequence, the landlord is liable for damages. But the more deadly results of bad drainage, or other sanitary neglect, in city or in house, have not commonly been thought to give good claims for money payment, probably because it has been less easy to demonstrate that the unsanitary conditions are the cause of the consequent illness. It would appear, however, that civilization is progressing, for we notice in the *British Medical Journal* of April 20 that a Mr. Charsley has recovered damages on account of typhoid fever, alleged to have been produced by the defective drainage of the house which he, Charsley, had rented of one Mr. Jones. The judge even went so far in this case as to state that "it seemed to him that the defendant honestly believed that the house was in fit condition for habitation, but that was not the question. If the jury thought that the house was not fit for human habitation, the plaintiff was entitled to damages."

Reports on Therapeutic Progress.

THE PLACE OF ELECTRICITY IN THERAPEUTICS.

The meeting of the New York Academy of Medicine held on March 21, 1889, was devoted to the different phases of the "Place of Electricity in Therapeutics," the subject being discussed by several members, from whose remarks we abstract the more important points as reported by the *Medical Record* for April 6, 1889. First, DR. M. ALLEN STARR read a paper on the "Physics and Physical Action of Electricity," concluding his remarks with the following statements: 1. Static electricity offered nothing more than the interrupted galvanic current, and failed to furnish those effects which were most desirable in the treatment of disease. 2. The constant galvanic current could produce chemical changes which aided nutrition or destroyed tissue according to the strength employed. 3. The constant galvanic current could transfer medicines into the body from without. 4. The interrupted galvanic current or faradic current could excite various organs to functional activity. 5. It was questionable whether the pathological state causing organic diseases could be in any way influenced by electricity. 6. If functional diseases were benefited, it was in an uncertain manner, and the physiological indications for the agent were as yet uncertain. As a therapeutic agent its use was somewhat limited, and careful observation and analysis were required to establish its sphere.

After the constant use of electrical treatment for the past ten years, the author said he had been disappointed in the results obtained, and he could not ascribe this to any defect in application, as he used the best method with careful measurements.

DR. L. C. GRAY then read a paper entitled the "Effects of Electricity on Central Nervous Diseases." First, however, he made some remarks on the paper of Dr. Starr, which, he said, contained some statements which had rather startled him. He would reply to the question, Could electricity be given as definitely for a definite purpose as opium? in the affirmative. There were certain affections which he would undertake to relieve with electricity with as much certainty as other affections with opium or quinine. Neither opium nor quinine was infallible, nor was electricity. He would undertake by electricity to relieve certain neuroses, and benefit as positively as any drug could do certain symptoms in cerebral disease, but not to cure the organic disease. He did not know that anything more positive could be said of the effects of opium or quinine, or any other drug. But there was a great deal in the way electricity was used, and at the opening of his paper he briefly stated the latest approved manner of using it.

The reader based his deductions regarding the value of electricity in therapeutics on six-

teen years' experience with it. For convenience he divided the diseases of the brain into the insanities and gross cerebral lesions. From the insanities he excluded in this connection the very chronic and incurable forms. But subacute mania, melancholia, the insanity of doubt, and functional insanities could all usually be benefited by electricity, but only in the period of convalescence, not in the acute stage.

Of the gross cerebral diseases it might be said that it was useless to administer electricity in brain tumors, meningitis of traumatic, epidemic, or aural origin, or in facial hemiatrophy. It was a useful adjuvant in intracranial syphilis in the early stage of headache and insomnia, and sometimes in the later stage following hemiplegia. Hemiplegia due to neoplasm and meningitis was omitted from treatable cases. If the molecular changes induced by chronic endarteriitis of middle age, or of nephritis, or by emboli were such as not to lead to a fatal issue in case of hemiplegia, they could usually be favorably influenced by electricity when the primary symptoms of shock had thoroughly passed off. Meningitis of traumatic origin, if slight, might be benefited by electricity, and if hemiplegia of vascular origin were not followed by contracture it could also usually be thus benefited. Tic douloureux was uncertain in its response to electricity.

Dr. Gray said he had no faith in static electricity. The two currents which would answer every purpose of the physician were the galvanic and faradic. Speaking in a general way, the insanities required only electrical treatment directed to the intracranial contents, and this was best done with the galvanic current. Gross cerebral diseases produce two classes of symptoms: those which were entirely cerebral, and those which were both cerebral and peripheral. In the former class galvanism addressed to the cranial contents would usually answer every purpose, while in the latter it might be better to address galvanism to the intracranial contents, and faradism to the affected peripheral structures. The method of applying the currents in the several cases was described.

He said the question as to which pole should be employed in the case of faradism, or as to whether an ascending or descending current should be used, had been a very puzzling one to him. He was perfectly well aware that there was a difference between the chemical effects of the negative and positive pole, that there was a physiological difference upon which had been based the prognostic use of electricity, and also that every patient could distinguish the positive from the negative pole by the sensation; yet, in spite of all these indubitable differences between the two poles, he had never been able to satisfy himself that there was a therapeutic difference between them. Reasoning from *a priori* considerations, the text-books told us that the positive pole was sedative and the negative pole stimulant, yet he had over and over again unavailingly endeavored to obtain indications for the use of the positive or negative pole in a given disease. The only rule which he could lay down was this: Where one pole did not agree, try the other; and if that did not agree, stop using electricity.

Dr. W. R. Birdsall read a paper on the "Effects of Electricity on Spinal-Cord Diseases." He admitted as truthful the doleful picture of the therapeutic effects of electricity in spinal-cord diseases, which Dr. Starr had drawn, only in so far as it applied to other remedies as well. Too much should not be expected of this agent in a class of diseases which were incurable. Like Dr. Starr, he had never seen a case of organic disease of the spinal cord cured by electricity; but he went further, and stated that he had never seen such a case cured by any single therapeutic agent whatever. But for the relief of symptoms he had seen electricity serve a more useful purpose than any other. And, as a rule, in this class of affections we attempted only to follow symptomatic indications, as the relief of pain, anæsthesia, spasm, paralysis, trophic changes, symptoms which were the result of a variety of diseases of the spinal cord and its membranes. It might be laid down as a rule that in acute inflammatory affections of the cord electricity was not beneficial, and might prove injurious. Its use should be restricted to non-inflammatory affections. This led to the question, What were the effects produced by electricity? It was essentially a stimulant, an exciter of living tissues.

In therapeutic application we could not expect to find the distinctive effects of the cathode and anode as observed when electricity was applied to an isolated nerve. We did, however, know the effects of these agents on nerve-tissue, even more definitely, he thought, than we knew the effects of drugs. He believed a large part of the beneficial effects of electricity were indirect or reflex. The very fact that one could produce a strong muscular contraction, or sensory impression,

by static electricity showed that it was an agent of decided force. In this connection the question of influencing the spinal cord or deeper structures naturally arose. He agreed with Dr. Starr that, by the ordinary method of applying the electrode to the back, a very feeble impulse was obtained in the cord, yet he believed that the cord could be excited in that way. All the tissues between the two electrodes which had a resistance not greater than that which the electro-motor force would overcome transmitted the current according to the ratios of their resistance. He believed, however, that the main benefit obtained from electricity in spinal-cord diseases was due to the peripheral impression.

The chief benefit which he had observed was in enabling the patient to recover more rapidly from partial paralysis than he would without electricity. Also in infantile paralysis improvement had taken place under galvanism in cases which had previously been at a stand-still. Paralysis from myelitis, also facial paralysis and lead palsy, had improved under electricity, chiefly galvanism.

Dr. A. D. Rockwell then read a paper on the "Effects of Electricity in Peripheral Nerve-Lesions." The cases considered were those of functional troubles, among the more important of which was facial paralysis. He had seen many such cases hastened towards a cure by electrical treatment. In illustration of the form of current called for in given cases, he cited one in which the physician who first saw the patient, suffering from facial paralysis, applied faradic electricity without appreciable benefit. When brought to Dr. Rockwell, he made use of galvanism, and the patient recovered. Here the intramuscular nerves were paralyzed in the beginning and failed to react to faradism, while the muscular fibres being still intact, they responded to galvanism. Faradism exerted its greatest influence upon the intramuscular nerves, and galvanism upon the muscular fibres. Dr. Rockwell had obtained much benefit from electricity in diphtheritic paralysis.

Dr. E. D. Fisher read a paper on the "Effects of Electricity in Functional Nerve-Affections." The reader alluded briefly to the theory of the action of the agent in these cases, but said he quite agreed with Erb, who had expressed the view that we might as well do away with the bromides and arsenic in functional nervous diseases because we did not understand the theory of their action as to abandon electricity because of our ignorance of the laws underlying its influence. Undoubtedly galvanism was more important as a remedial agent in functional nervous diseases than was static or faradic electricity; yet, with regard to static electricity, he would say that in his opinion it should not be so positively discarded as it had been by Dr. Starr. Especially in neurasthenic cases did it have a stimulating and pleasing effect. It was in functional diseases, with error in nutrition, and not organic troubles, that static electricity found its field of usefulness.

SUSPENSION IN THE TREATMENT OF PROGRESSIVE LOCOMOTOR ATAXY.

Professor Charcot recently gave a clinical lecture on vertical suspension of the body in the treatment of progressive locomotor ataxy and some other diseases of the nervous system. This novel method of treating tabes dorsalis was first initiated by Dr. Motchoukowsky, of Odessa, who published a *brochure* on the subject in 1883; but it received no attention in Western Europe till 1888, when Professor Raymond, of Paris, while on a scientific mission in Russia, was struck with the results presented to him. Dr. Ouanoff, his fellow-traveller (a pupil of the Salpêtrière clinic), showed its practical application there. In Motchoukowsky's pamphlet considerable improvement was ascribed to it in twelve tabetic persons; also in various neurasthenias, independent of tabes, in which the sexual functions were re-established by this treatment. The patient is suspended for about three minutes by a Sayre's apparatus, and the arms of the patient while suspended are raised every fifteen or twenty seconds to increase the traction on the spinal column.

Charcot's tabetic patients numbered eighteen, with four hundred *séances*. Of these, four were only suspended each three times; the rest went on regularly. Of these Professor Charcot says, "The remaining fourteen have experienced in varying degrees an improvement, which in eight has been quite remarkable." All were pronounced tabetics. Walking is improved to begin with; the patients say they can walk better after the first suspension. This improvement at first lasts only a few hours, but after eight or ten sittings persists. After twenty or thirty sittings Romberg's sign disappears. Then vesical troubles are lessened or removed; also the lightning pains. Sexual impotence gives place to sexual desires and erections. (Experiments by Dr. Ouanoff on healthy persons

have shown that this method has an exaggerating effect on virility.) The cotton-wool feeling in the feet gives way more or less to healthy sensations, and in general the whole health improves. Every patient steadily improved, with one exception, a young tabetic, aged 32, who at first improved, then fell off, then again improved somewhat. But the knee-jerks have not reappeared in any of the patients after three months' treatment, nor are the pupillary symptoms altered. As to other diseases, a young female with Friedreich's disease was greatly improved by the treatment. In two neurasthenic and impotent patients the sexual functions were re-established. But a patient with disseminated sclerosis was made worse, for, after two sittings, a spasmodic paraplegia appeared, which, however, gave way in three days. Further trial of this method is required before an opinion of its value can be given. The results are most encouraging so far, and at any rate perfectly harmless.

After the favorable report of Professor Charcot on this treatment requests were daily received at the Salpêtrière for an account of its practical application. In answer to these, Dr. Gilles de la Tourette has written the article of which this is an abstract, and begins by reminding us that the treatment was first tried in 1883, by Dr. Motchoukowsky, of Odessa. The author has superintended about eight hundred suspensions of forty patients. The suspension is easily effected when conducted in the proper way, but that way must be known. Sayre's apparatus is the one made use of (no corset is required), and its construction is well known. The weight of the body is borne partly by padded broad straps, beneath the chin and occiput, forming one piece, and partly by two separate shoulder-straps. The rings supporting the head-straps are capable of adjustment, and the fixation of the apparatus generally requires great care. The size and shape of the patient's head must be taken into account, and soft pads may be interposed, where necessary. The length of the shoulder-straps is a most important consideration. If too long, the brachial plexus is compressed, and tingling and pain in the arm is set up; if too short, on the other hand, the muscles of the neck are stretched to an intolerable degree. Two or three trials have to be made before the exact disposition of each strap and ring for a particular patient is known. The operator then very quietly raises the patient from the ground, by the pulley, just far enough to prevent the extended toes from touching the floor; he is then steadied to prevent oscillation, and the operator fixes his eyes on a second's watch to determine accurately the duration of the *séance*. While the patient is thus suspended, he is directed to raise his arms gently from time to time; if this can be done it renders the suspension and traction more efficient. The average time of suspension is three minutes, and it ought in no case to exceed four. At first, indeed, half a minute is enough, and the time is gradually prolonged at each subsequent sitting, till, after the sixth or eighth, the period of three minutes is attained. Even here, individual susceptibilities must be taken into account,—*e.g.*, a heavy patient will not bear a long suspension so well as a lighter one. When the operation has been well conducted, no painful traction of the neck-muscles is felt next day. Neither pain nor even fatigue should be occasioned.

Daily "sittings" are harmful; every other day is quite often enough. The patient must be let down with extreme gentleness, and not by a succession of shocks. He should be supported while being relieved of the apparatus, and should afterwards rest a short time in an arm-chair placed ready. The patient's costume is not important. He should take off his coat before the suspension, and his neck should be bare, or at any rate not compressed. The traction by the operator should, of course, be made from the upper pulley, not the lower, if the portable tripod suspension apparatus is used. But this tripod is not the best arrangement here, though very convenient in applying a plaster-jacket; for the patients may grasp one or other leg of the tripod with convulsive force when they find themselves off the ground, and may even overturn the apparatus. As to the duration of the treatment, this is a point not yet settled. Patients who began it four months ago at the Salpêtrière are still attending there for it, and appear to improve steadily (*et semblent s'améliorer d'une façon progressive*). In any case, as Professor Charcot says, the treatment may be boldly tried with perfect confidence as to its harmlessness when the proper procedure is adopted.—*London Medical Recorder*, March 20, 1889.

SULPHONAL IN NIGHT-SWEATS.

In addition to the hypnotic properties enjoyed by sulphonal, this drug is capable, according to Dr. Böttrich, of Hagen, West-

phalia, of exercising a most beneficial influence in night-sweats. It acts, he thinks, very similarly to atropine, but, unlike it, it is quite free from any undesirable effects. He found this property out by accident, having prescribed a ¼ of a gramme (nearly 4 grains) for an old lady of 80 as a sleeping powder. The patient had been suffering from the most profuse night-sweats, obliging her to change her things twice during the same night. After the first dose she asked the doctor whether he had not put something into the powder to prevent the sweats. On making further observations, Dr. Böttrich was able to convince himself that, as a rule, ½ gramme (7½ grains) of sulphonal will stop night-sweats. Its effects seem, fortunately, to be somewhat permanent, as even after the drug has been stopped the night-sweats are found to be much less severe than they were previously to taking it.—*Lancet*, April 27, 1889.

THE ACTION OF SULPHONAL IN INSANITY.

Dr. Wm. Mabon publishes in the *American Journal of Insanity* for April, 1889, reports of eighteen cases of various forms of insanity in which sulphonal was administered as a hypnotic, being given one hundred and nineteen times on one hundred and fourteen different nights. It was employed twenty-six times in doses of 15 grains; eighty-one times in doses of 30 grains; nine times in doses of 45 grains; three times in 60-grain doses. On eighty-three nights sleep was produced, which continued six hours or more; on twenty nights, from three to six hours; and on eleven nights, less than three hours. The sleep produced was natural on ninety-seven nights, and restless and broken on seventeen. The time required to produce sleep was, on the average, one hour and a quarter. The only unpleasant after-effect noted was slight somnolence in two or three instances. With the later administration of the drug in these same cases this symptom was not persistent. In regard to the dosage, the facts brought out by these observations seem to indicate that not much can be expected from 15-grain doses in the class of cases in which the trials were made. Generally 30 grains will be found sufficient to bring about a quiet and refreshing sleep. As to the method of administration, in the early trials sulphonal was given suspended in mucilage, but later in hot milk and hot gruel. The principal advantage of using the latter menstrua was the increased promptness of action. (In one instance there was a difference of an hour between the two methods.) During the period of these experiments comparisons were made with other hypnotics, and the conclusions arrived at were that in the majority of cases the sleep produced by sulphonal was the most satisfactory; it was calmer, continued longer, and was more refreshing than that produced by any other hypnotic. Among the advantages that sulphonal possesses over other sleep-producing remedies may be mentioned the absence, after its use, of disturbances of digestion, secretion, circulation, and respiration; its easiness of administration, its tastelessness, its lack of odor, and, finally, the important fact, that the resulting sleep closely approximates in quantity and quality that of nature.

Since the foregoing observations were recorded it is stated the use of sulphonal has been continued by the writer with similarly satisfactory results.

THE TREATMENT OF BURNS PRODUCED THROUGH SULPHURIC ACID.

The deep alterations and destruction of tissue which are produced from the contact of sulphuric acid with the skin are attributable to the great affinity which the sulphuric acid possesses for water, so that burns produced by sulphuric acid are not burns in the strict sense of the word, but should be more correctly described as violent dehydration. The indications, naturally, for the treatment of such burns are to rapidly dilute and neutralize the acid as soon as possible. In a paper on this subject by Ribaud, referred to in the *Centralblatt für Klinische Medizin* for April 13, 1889, objection is taken to the ordinary application of alkalies and oils to such burns. It is true that magnesia neutralizes the acid, but does not unite rapidly enough with the sulphuric acid which has penetrated into the deeper parts of the wound; while in addition magnesia yields no water to the sulphuric acid. The treatment with oils is still more objectionable, since a degree of heat is produced by their action, which almost approaches the boiling-point. The treatment with alkaline waters is in all respects preferable, and if alkaline waters are not at hand in sufficient quantity, the employment of very large amounts of fresh water, immediately after the accident, forms the best and most ready treatment. The author states that the finger may be held

for two and a half minutes in pure sulphuric acid, and then, if immediately washed off with large amounts of water, will be free from any burn. A longer immersion than this will, however, in all cases produce a burn.

THE TREATMENT OF ACNE WITHOUT ARSENIC, SULPHUR, OINTMENTS, OR LOTIONS.

At a meeting of the Medical Society of the County of New York, held April 22, 1889, Dr. Geo. H. Fox read a paper with the above title (*Medical Record*, May 4, 1889). He said it might be inferred from the title of his paper that he objected to the use of arsenic, sulphur, ointments, or lotions in the treatment of acne, but such was not the truth. These time-honored remedies were doubtless valuable, yet their usefulness was limited, and their routine employment was what he objected to. Some cases of acne could be cured by local treatment alone, but the majority of cases demanded general treatment; that is, the treatment of the patient, and not merely of the patient's skin. In the general treatment the administration of medicines might sometimes play an important part, but the profession had yet to learn that diet and hygienic rules were worth more than all the drugs of the Pharmacopœia. From the stand-point of the therapeutist the best division of acne was into the irritable and the indolent forms of the disease. The practical value of such a division had long been appreciated in the treatment of ulcers. The irritable form was largely reflex in origin, and was greatly affected by disturbances in the alimentary tract and of menstruation. The skin was usually fine and soft, quickly inflamed by stimulating applications, and the use of the watch-key, with which to press out the comedones, was apt to cause raised red spots. Local treatment in these cases, except of the most soothing character, was contraindicated; general treatment was most efficacious. In the indolent form the vascular excitability just mentioned was comparatively slight, while the glandular obstruction was the most important feature. The skin was likely to be coarse and doughy, often greasy. The accumulation of the foreign bodies in the skin led to the formation of the papules and pustules, and in strumous patients to abscesses. In these cases the glands should be evacuated; the skin, in other words, thoroughly cleansed. Soap and water and ointments did not answer.

Bearing in mind that the irritable form required general treatment, and the indolent form local treatment, it would be found that in the former physicians relied more upon arsenic than upon any other remedy; but he thought that if arsenic were banished from the globe the average physician would be far more successful in the treatment of acneous affections. Sulphide of calcium had been recommended by some authorities, but he thought it was liable to lead one using it to neglect more important measures. Ergot possessed value which was not generally recognized. Its chief benefit was seen in indolent aene, and he had come to regard Dr. Denbow's explanation of its action as nearer correct than that which he had formerly offered. In the local treatment of irritable acne he had tried many remedies, but would simply say that at present he seldom found occasion for their use. The treatment of acne in general, which he had found of greatest benefit, was neither new nor original; it consisted in diet and local massage. Diet struck at the root of the disease. Local massage could be made with the fingers or instruments adapted to the purpose. Its object was twofold, to empty the glands and to cause the disappearance of the inflamed lesion. It required to be persisted in. Among the instruments to be used he now felt like apologizing for his former criticism of the circular curette. Trial had proved its value, and the redness which it left would disappear in due time. No fixed plan of treatment of acne would apply to all patients.

THE PURGATIVE EFFECTS OF GLYCERIN ENEMATA AND SUPPOSITORIES.

In the *Novosti Terapii*, No. 4, 1889, p. 49, Dr. F. F. Mīlëëff, of St. Petersburg, details his extensive experience concerning the use of small glycerin enemata and suppositories in habitual constipations of various kinds. The main results of his observations may be condensed as follows:

1. In those cases where accumulation of fæcal masses takes place in the lower portion of the large bowel, a rectal injection of 1 or 2 drachms of pure glycerin in an adult, and of ½ to 1 drachm in a child, is invariably followed by stools occurring in two or three minutes.

2. The fæcal masses do not show any signs of liquefaction or even softening; still, owing to lubricant properties of the drug, the act of defecation proves to be fairly easy and comfortable.

3. The enemata do not give rise to any slightest painful or unpleasant sensations about the rectum. Neither do any phenomena of rectal irritation supervene, even on a prolonged employment of the injections.

4. The purgative effects of glycerin should be attributed to its stimulating action on the nervous and muscular apparatus of the large bowel, which action is, probably, determined by the drug greedily extracting water from the intestinal mucous membranes with its nerve-fibres. The desiccation irritates the latter, and thus excites a reflex contraction of the intestinal muscular coat. The hypothesis finds a strong support in the fact that any dilution of glycerin with water markedly weakens its purgative action, and that the more in proportion the larger is the amount of water added.

5. Glycerin enemata are especially indicated (*a*) in the constipations of pregnancy, where ordinary water enemata are inconvenient on account of their considerable bulk, which causes discomfort to the woman; and (*b*) in infantile constipation caused by unduly prolonged feeding on milk alone, and associated with fæcal accumulations in, and consecutive distension of, the sigmoid bowel. In cases of the kind, glycerin enemata are very useful on account of their energetic action in the intestinal muscles, and convenient because of their small bulk.

6. As to glycerin suppositories (containing half a drachm of the drug each), they are said to act well (in five minutes or so) only in such cases where no pure glycerin enemata were previously employed, otherwise they remain inactive. Hence, Dr. Mĭlĕĕff is accustomed to commence the glycerin treatment of constipation with suppositories (a piece at bedtime), and passes to enemata as soon as the former cease to secure the result desirable.

7. As regards the apparatus for the enemata, Dr. Mĭlĕĕff thinks that any special contrivances are quite superfluous. At all events, he uses for the purpose an India-rubber urethral syringe with a piece of thick-walled elastic-tube on the nozzle.

[*Cf.* Dr. A. S. Polübinsky's paper on the subject in the *London Medical Recorder*, March, 1889, p. 91. In the *Brit. Med. Jour.*, December 22, 1888, p. 1424, Dr. George Grewcock, of Brighton, says that he "found out quite accidentally a novel method of applying glycerin," which is "equally efficacious with the clyster. . . . If a piece of cotton-wool alone, the size of a nut, is well saturated with glycerin, and inserted as a suppository, in a short time a copious motion is produced." Certainly it would be worth while to give a fair trial to the plan which makes superfluous any appliances, including Dr. Mĭlĕĕff's urethral syringes.—Rep.]—*London Medical Recorder*, April 20, 1889.

THE USE OF MENTHOL IN ASTHMA.

In the *Therapeutische Monatshefte* for April, 1889, Dr. Theodore Jores writes that since October of 1888 he has had a lady of 50 years of age under his treatment, in whom, in the summer of 1888, a number of polypous growths were removed from the nose. When the patient first came under his care she suffered from congestion of the head, associated with great difficulty of breathing, the attacks coming on usually every two days. Foot-baths, cathartics, and leechings over the mastoid processes of both sides brought some relief. The attacks of congestion gradually disappeared, while the asthma became more and more prominent. A number of remedies were employed in the treatment of this symptom, which were, however, generally without avail. Dr. Jores then made use of menthol in a twenty per cent. solution in olive oil, which was followed by the almost complete disappearance of all pulmonary symptoms. The drug was used as an inhalation and from its very first application, and in every instance served to relieve the asthmatic attacks.

THE TREATMENT OF WHOOPING-COUGH.

Dr. Tordeus, of the Hôpital St. Pierre, Brussels, in a clinical lecture on "Whooping-Cough," concludes with a few words as to the treatment he adopts. He has no faith at all in the administration of preparations of belladonna for the purpose of preventing the development of the disease; the only prophylactic measure which, in his opinion, is worthy of any reliance being the rigid isolation of the patients. He recommends that as soon as whooping-cough has broken out in a family all the other members who have not already had the disease should be sent away, especially those who may be weak, rickety, or very young, as such are predisposed to bronchitic and pulmonary inflammations. Before the children which have been sent away are allowed to return, a thorough process of disinfection should be carried out, not only of the room occupied by the patient, but of all ob-

jects with which he may have come in contact. This is to be effected by means of carbolic acid, chloride of zinc, the vapor of sulphur, boiling water, or the hot-air chamber, according to the nature of the things to be disinfected. As to medicine, during the early or catarrhal stage, ipecacuanha and bicarbonate of soda should be given, with the object of rendering the phlegm less thick and tenacious; afterwards, when the nature of the disorder has declared itself, germicides—as carbolic acid, salicylic acid, benzoic acid, sulphate of quinine, resorcine, etc.—should be prescribed. M. Tordeus especially recommends inhalations of a three to five per cent. solution of benzoate of soda, even in the case of very young children, though he does not specify the kind of apparatus he employs for this purpose. In order to moderate the violence of the attacks, bromide of potassium, oxide of zinc, belladonna, hyoscyamus, cocaine, antipyrin, or chloral may be given. As the disease is beginning to disappear, expectorants, such as chloride of ammonium, senega, and liquorice, are useful; and, finally, anæmia and debility during convalescence may be treated by country air, cod-liver oil, preparations of iron, quinine, and arsenic, and nourishing diet. Where symptoms of broncho-pneumonia show themselves, all depressing drugs must of course be avoided. In such cases M. Tordeus recommends wet packs and carbonate of ammonia, combined with alcohol.—*Lancet*, April 27, 1889.

SULPHATE OF CALCIUM AS A REMEDY FOR INFANTILE CONVULSIONS.

In the *Archives of Pediatrics* for May, 1889, MR. H. VALENTINE KNAGGS recommends the use of sulphate of calcium in the convulsions which often occur in children from dentition, falls on the head, meningitis, and often acute tuberculosis. The dose required is small; for infants under 6 months of age, a grain of the sulphate of calcium may be dissolved in half a pint of water, and a teaspoonful of the solution given hourly, when the dose may cautiously be increased if thought desirable. In children over 1 year of age less caution will be required. The dose will vary from $\frac{1}{8}$ to $\frac{1}{16}$ of a grain every hour, or less frequently, according to the severity of the case. The drug must be freshly prepared and active, as it soon loses its virtues and becomes inert. It may be mixed in powders with sugar of milk, and a packet of them enclosed in tinfoil. Mr. Knaggs likewise states that antipyrin may sometimes be alternated with the sulphate with advantage, although these two drugs appear to be antagonistic to one another. Thus, in infantile convulsions antipyrin, in doses of one-half to two grains, repeated frequently, will often aggravate convulsions; but if it should appear that the sulphate is exerting too depressing an effect on the nervous system, antipyrin alternated with it will serve by its stimulative action to counteract this effect.

THE USE OF SOLVENTS IN CASES OF RENAL CALCULUS.

It is well known that a patient who habitually passes brick-dust or uric acid deposit in his urine will, sooner or later, develop symptoms of gout or stone, and it is probable that sulphates of magnesium and sodium will frequently prevent this condition developing into the more serious forms. In the *Canadian Practitioner* for April 16, 1889, MR. ARTHUR JUKES JOHNSON publishes a paper in which he claims that when a calculus of small size, composed of uric acid, is formed or is forming in the pelvis of the kidney, through the use of alkalies, we may dissolve such a stone to such an extent as to allow of its easy passage down the ureter, to be followed by its easy expulsion from the bladder. The medicinal remedies at present generally used are: caustic potash, the bicarbonate, acetate, and tartrate of potassium. The less frequently used are soda and lithia in different forms. The reason why this alkaline treatment has in all ages been looked upon with favor is easily discovered if we look at the composition of calculi in general. Three-fifths of all the calculi which form in the kidney or bladder of adults are composed of uric acid or the urates. The other two-fifths, or nearly so, are phosphatic. In three or four per cent. the stone is formed of oxalate of lime, and in one in a great many hundred of cystine. The uric acid calculus is found in water abounding in acid, the excess of which is expressed by the stone. The phosphatic stone is the product of alkaline urine, generally ammoniacal, of which condition it is the result. The urates, oxalates, and a few of the phosphates are found in the kidney, and are the product of certain constitutional derangements above alluded to. The greater part of the phosphatic material, whether in mixed or in phosphatic stones, is produced solely in the bladder, and is the product not

so much of any constitutional state as of a local diseased condition. If we examine these calculi still further, we will find that a difference exists in their nuclei also. The nucleus of the oxalate of lime calculus consists, not of mucus or epithelium, as is generally the case in the phosphatic stone, but is of the same composition as the exterior. The little mass is seen under the microscope to consist of a number of dumb-bell crystals firmly attached to one another. Dr. Lionel Beale, more than twenty years ago, found these collections in the uriniferous tubes of kidneys obtained from post-mortems, as also in the kidney of a fœtus, and in the urine of a child 2 years old. When these little masses have reached a certain size they adhere to one another, producing the well-known mulberry calculus. The uric-acid calculus may be composed entirely of uric acid, but it will generally be found that the nucleus consists of a mass of dumb-bell crystals of oxalate of lime.

Now, experimentally we know that uric acid, when in a specimen of urine sent to us for examination, is easily dissolved by an alkaline solution, some alkalies having more power in this respect than others, and their resultant salts being more soluble. The urate of sodium is to a certain extent soluble, the urate of lime more so, the urate of potassium the most soluble. Therefore potash has for a very long time been considered the most powerful agent that could be used in cases of uric acid gravel, and is one that can be taken for a long time without producing any objectionable effects. The citrate of potassium seems generally to be the best form to give it in, except when, as Sir Henry Thompson points out, it exerts too much diuretic action; then the bicarbonate should be used. Care, however, should be taken in using the carbonate; for if the solution in which it is given be too strong, as Dr. Roberts found, the calculus becomes coated with an alkaline biurate, and is not dissolved. But the citrate and acetate, as we know, when given by the mouth, become carbonates in the urine; and although about six drachms a day may be given of either of these, they should be very largely diluted with water. If, therefore, a calculus has formed, or is forming, in the kidney, and we know from our chemical and microscopical examination of the water that it is composed wholly or in part of uric acid, the treatment, we are told, should be to give potash to dissolve as much of the stone as possible, and plenty of water to suspend and carry away the resultant. Although this has been recommended on the highest authority, it is a treatment that is very difficult to enforce, chiefly because many patients object to drinking the necessary amount of cold water, whereas we know that water alone is a very good solvent. Hence a course of Vichy water is frequently ordered in these cases. But Vichy owes its utility to the carbonate of sodium it contains, of which about forty-seven grains exist in every English pint. Of the natural mineral waters, many are of undoubted value, not only on account of the potash, lime, or soda that they contain, but because they are all more or less purgative, and so assist digestion and prevent further deposit.

The most efficacious seems to be that obtained from the Waukesha Spring, known formerly as "Bethesda," but latterly as "Glenn."

Mr. Johnson does not claim that this water will destroy a uric acid calculus in the kidney, though it certainly will do so when such a stone is put into a bottle of it. The method of treatment which Mr. Johnson at present recommends is to order the carbonate, or citrate of lithium, to be taken in a tumbler of Bethesda water three or four times daily. In a very few days the pain and other distressing symptoms abate, and in a short time there will be evidence of the passage of a small calculus down the ureter or through the urethra.

This treatment should be combined with a careful diet. Alcohols, sugars, and fatty substances should be avoided, and care should be taken not to catch cold. But no treatment can be satisfactory unless the exact location and composition of the stone is ascertained. For to treat a phosphatic stone, even in the bladder, as if it was composed of uric acid, would rather tend to increase, instead of diminish, its size. It is a matter of doubt whether any solvent taken by the mouth has much effect on a stone that has formed in the bladder, an operation being generally the best treatment under these circumstances. But even here much may be done by solvents, not administered by the mouth, but injected into the bladder. The stone in these cases is generally phosphatic, and the mucous membrane of the bladder more or less irritated. It is advisable to have the water drawn off twice a day, and the patient should be taught how to pass the catheter for himself. If this is done, he can carry out the further treatment also. This consists in washing out the bladder, after having used

the catheter, with a solution of ⅓ to ½ grain of acetate of lead to the ounce of water, or 1 to 3 drops of dilute hydrochloric acid to the same quantity. It is best done by putting the solution into a 4-ounce rubber bottle, with stop-cock, and injecting half the contents. This is then allowed to run away, when the balance of the fluid in the bottle should be thrown into the bladder and allowed to remain.

THE USE OF SULPHUR IN VARIOUS DISORDERS OF THE ALIMENTARY CANAL AND LIVER.

In the *Lancet* for April 6, 1889, SIR ALFRED B. GARROD states that for many years he has been accustomed to administer sulphur in very small doses for a length of time in the treatment of disorders of the alimentary canal and liver; also in certain diseases of the joints, especially rheumatoid arthritis, and chronic muscular rheumatism and skin diseases. The form in which he administers it is that of a lozenge which contains five grains of the milk of sulphur and one grain of cream of tartar. This lozenge is stated to be quite agreeable to the taste, and contains enough sulphur for therapeutic purposes. He claims that on the alimentary canal sulphur acts as a stimulant to the normal peristaltic movements, and in moderate doses becomes a laxative. It is probable that the stomach itself is little influenced by the sulphur, as the surface and contents of that organ are usually acid in reaction, and possess no solvent power; but when it arrives at the duodeum, and meets with a different condition of the mucous membrane and the presence of bile and pancreatic fluid, both alkaline in reaction, more or less of it becomes converted into a soluble sulphide, which is absorbed by the portal vessels, and passes first through the liver and afterwards into the general circulation by the hepatic vein. From the blood it afterwards becomes eliminated partly by the skin and partly by various mucous membranes. We have good evidence that it is thrown out by the skin in the fact that silver worn close to the surface becomes blackened to some degree when sulpur is taken continuously, and the odor of sulphuretted hydrogen can occasionally be detected in the breath. The presence of the cream of tartar in the lozenge helps to prevent the formation of any soluble sulphide in the stomach, and hence the absence of sulphurous eructations. Any soluble sulphur, however, which reaches the cæcum and colon, where the reaction is again acid, is apt to evolve hydrogen sulphide, and impart odor to the contents of the lower bowel.

As the alimentary canal is influenced partly by the direct action of the sulphur on its mucous membrane, partly by the circulation of the sulphuretted blood through the intestinal capillary system, and partly by the altered and increased flow of bile from the liver, it will be naturally expected that in morbid states of this canal we should be able to detect marked effects from the continued administration of the remedy.

Dr. Garrod finds that even this small quantity of sulphur usually produces appreciable laxative effects. He summarizes the results of his experience with sulphur as follows:

1. The results contained in the present communication were derived from the administration of very small doses of sulphur continued for a lengthened period of time, the doses being much smaller than those hitherto employed, often not exceeding five grains each day, and the time of exhibition much longer,—namely, weeks, months, and in some cases years. 2. A lozenge, named the Compound Sulphur Lozenge, containing five grains of sulphur and one of cream of tartar, was usually prescribed, as being very convenient and by no means unpleasant in taste; and it was found that patients could be readily induced to persevere in using them for an almost indefinite time. 3. The physiological effects of these minute doses of sulphur are observed upon the alimentary canal and the organs connected with it; also on the pulmonary mucous membrane and the skin. 4. Sulphur is not an element foreign to the system, as it is contained in the most important proximate principles of the blood and flesh, and likewise of the bile and saliva. 5. Sulphur given in the manner above described is of great value in many morbid states of the alimentary canal and liver, as in cases of hepatic sluggishness and in piles and hemorrhoidal hemorrhage; besides which the continued use of the lozenges is often quite effectual in obviating habitual constipation without producing the unpleasant action often pertaining to ordinary aperient medicine. The beneficial effect on the bowels has doubtless been the chief cause of the lozenge having become so much liked, so continuously persevered in, and so extensively used. 6. Sulphur in small doses is sometimes useful in affections of the pulmonary mucous membranes. 7. Sulphur has long had a reputation, and doubtless is of much value, in many

diseases of the skin and its appendages. 8. Some arthritic diseases, especially chronic forms of rheumatoid arthritis and gout, and also many cases of muscular rheumatism, are much benefited by the continued use of small doses of sulphur.

THE USE OF GLYCERIN ENEMATA AND SUPPOSITORIES.

In the *Vratch*, Nos. 1, 3, and 4, 1889, p. 1, DR. ALEXANDR S. POLÜBINSKY, of St. Petersburg, publishes an ably-written and very instructive paper on the treatment of constipation of various forms by means of glycerin, administered in the shape of either enemata or suppositories. The paper is based on fifty cases from Professor V. A. Manasseïn's clinic, of which, in forty glycerin enemata and in ten Boas's suppositories were employed. As regards the quantity of glycerin used for an enema, in one case 1 gramme was injected; in nineteen cases, 2 grammes; in thirteen, 3; and in seven, 4. The suppositories contained invariably 2 grammes of the drug, the constituent being either gelatin or cacao-butter. Forty-five patients were men, aged from 12 to 55, and five women of from 10 to 40. The following brief summary deserves to be placed before our readers:

A. *Results of Clinical Experiments.*—1. In twenty-three cases (forty-six per cent.) the administration of glycerin was followed by abundant motions; in nineteen (thirty-eight per cent.), by scanty stools; and in eight (sixteen per cent.), no action of the bowels took place. 2. The first group includes: *a*, such cases where the presence of fæcal masses in the S.'Romanum could be ascertained both by palpation and percussion; and *b*, such ones where the fæcal accumulation could be elicited only by percussion. In the former subdivision the stools passed were solid and normally shaped; in the other they were rather loose (gruel-like). The first "call" was felt by the patient usually in one or two minutes to gradually increase in its intensity, and to be followed by a motion in three, four, or five minutes. The action was not attended or followed by any unpleasant sensations, except one case, where a rather vivid local burning was experienced by the patient for about fifteen minutes. A controlling enema, made of two and a half or three tumblerfuls of water, and administered after defecation, gave negative results (that is, the water returned unchanged) in nineteen cases, while in four the fluid was found to be intensely stained with fæcal matter. In one of the former nineteen cases, however, a subsequent administration of castor-oil (℥i) was followed by a rather abundant stool. 3. The second group includes: *a*, such cases (six) where an ordinary enema, administered subsequently, did not bring about any action of the intestines; palpation detected fæcal accumulation only in the sigmoid bowel, the cæcum being empty; *b*, such cases (nine) where a glycerin enema produced only scanty stools, but a subsequent ordinary enema was followed by a free discharge; the examination proved that both the sigmoid bowel and cæcum (in other words, the whole large bowel) contained solid or loose fæcal masses; *c*, such cases (four) where an after-glycerin aqueous enema remained inactive, but a dose of castor-oil caused abundant motions. The examination gave the same results as in the preceding subdivision, the cases concerning constipation of two or three days' standing. 4. The third group refers to such cases where glycerin gave rise solely to fleeting "calls," but otherwise remained quite inert, stools following a subsequent administration of ordinary enemata or castor-oil. 5. In the shape of suppositories, glycerin acts somewhat more slowly than when injected into the rectum, stools taking place in ten, fifteen, or eighteen minutes, which depends simply upon the circumstance that gelatin and cacao-butter require a certain time for their liquefaction. 6. The "calls" induced by glycerin are short-lasting, and when the patient postpones or inhibits his defecation beyond the time indicated above, it may sometimes happen that no stool takes place at all.

B. *Theory of the Action of Glycerin.*—1. The eccoprotic action of the drug cannot possibly be attributed to anything like its softening or liquefying fæcal masses, since (*a*) water, milk, olive-oil, and other fluids, when injected into the rectum in similarly small quantities (6 grammes or so), fail to excite any motions; (*b*) when injected in such trifling doses, glycerin is rapidly absorbed by the mucous membrane; (*c*) stools occurring after glycerin enemata are usually solid and sausage-shaped,—that is, show no signs of liquefaction; (*d*) neither are the masses covered with any watery or slimy layer; (*e*) stools take place within a short time after the administration of glycerin, while the liquefaction process should necessarily require a comparatively long interval. 2. Glycerin undoubtedly causes a local irritation (probably congestion of the rectal mucous membrane, since

(*a*) all patients experience a sensation of warmth or some burning in the rectum; (*b*) there is observed a slight rise of the rectal temperature after the enemata; and (*c*) on a digital exploration during "calls" there are detected fairly strong contractions in the upper portion of the rectum. The drug, however, does not increase the secretion of the rectal mucous membrane. 3. The irritation lasts until a complete absorption of glycerin. Possessing a great absorbability, the substance very rapidly penetrates into the (very rich) lymphatic vessels of the rectum, and, having disappeared from the latter, ceases to act. Hence it is unable to establish any considerable peristaltic action of the bowel lying higher up from the sigmoid intestine.

C. *General Conclusions.*—1. Best results are obtained from glycerin in cases of fæcal accumulation in the rectum and S. Romanum. 2. In cases of fæcal stagnation occurring higher up (typhlitis, general intestinal catarrh, etc.) the drug is altogether useless. 3. Glycerin enemata or suppositories are indicated, especially (*a*) as a means for "training" the rectum—that is, for exciting regular rectal "calls"—in cases of habitual constipation; (*b*) in cases of constipation caused by fæcal accumulation in the large bowel, and depending upon atonic state of the intestinal muscular coat, as occurring most commonly in women after parturition. Since intestinal atony in such patients is usually accompanied by a similar state of the abdominal press, a systematic employment of glycerin enemata must be obviously supplemented by daily abdominal gymnastics and massage, faradization of the abdominal muscles, and intrarectal galvanization; (*c*) in such cases where the rectum and sigmoid bowel are mechanically compressed by pelvic tumors (including early pregnancy); (*d*) in retroversion of the uterus associated with pressure on the rectum; (*e*) in children suffering from scrofula of a torpid variety; (*f*) in such persons who experience difficulty and pain on defecation because of their fæces being very hard, and who accordingly often abstain from stools. Here glycerin proves useful mainly as a local lubricant. 4. On the whole, glycerin enemata should be preferred to suppositories, since the latter (*a*) are more expensive; (*b*) their use is rather uncleanly (they easily melt in the hands, etc.); and (*c*) their introduction into the rectum by a finger represents a by far more unpleasant procedure than an injection by means of a syringe. 5. In one group of cases, however, suppositories are to be preferred to enemata. It is the group mentioned (sub. 3, *f*) where a relatively slow action is desirable, and where lubricant effects of glycerin are intensified by those of cacao-butter.—*London Medical Recorder*, March 20, 1889.

THE USE OF RECTIFIED OIL OF TURPENTINE IN CROUP.

Dr. M. Kewentaner in the *Wiener Medizinische Blätter*, No. 9, 1889, speaks in the highest terms as to the value of the employment of rectified oil of turpentine in idiopathic croup. He refers to the case of a boy, 2 years of age, who was taken sick in May last with cough, hoarseness, and symptoms of laryngeal obstruction. The latter symptom became so alarming that the little patient was sent to the hospital with the idea of having tracheotomy performed. When the author saw the patient he found him almost asphyxiated, with an absolutely aphonic cough, livid face, pulse scarcely detectable, and all respiratory movements of the chest invisible; while inspection of the throat showed great inflammatory reddening. A coffeespoonful of pure oil of turpentine was administered with all the necessary precautions, and ice compresses placed around the neck. During the night the patient rested somewhat, and slept for a few hours. In the morning a second similar dose of turpentine was given, and on the third day a mass of whitish-gray membrane was expectorated with coagulated mucus. The following prescription was then ordered:

> Oil of turpentine, 4 parts;
> Oil of sweet almonds, 10 parts;
> Simple sirup, 20 parts;
> Mucilage of gum arabic, 40 parts;
> Yolk of egg, 15 parts;
> Cinnamon-water, 50 parts.

Of this one coffeespoonful was administered every two hours; complete recovery followed. In a similar case, in addition to the internal administration of oil of turpentine, spraying of the throat was practised with the oil of turpentine, tincture of eucalyptus globulus, and carbolic acid, each 4 parts; alcohol, 300 parts; and distilled water enough to make 1000. The author claims that the administration of the oil of turpentine produces a violent cough, which is followed in a short time by the expectoration of copious mucoid sputa and the detachment of the croupous membrane.

THE COMPARATIVE VALUE OF THE DIFFERENT METHODS OF TREATING ACUTE GONORRHŒA.

Under this somewhat misleading head, DR. ANDRÉ MARTIN, physician-major, publishes an interesting article in the *Journal de Médecine*, in which he contrasts what he calls the old with what he calls the modern methods of treating acute blennorrhagia.

The old or classic treatment begins at a date more or less remote from the onset of the disease, respects the period called inflammatory, and is directed to the stationary period (*période d'état*) and period of decline; it is both general and local, including, with rest and dieting, the balsams (copaiba, gurjun, sandal) alone or combined with injections; the latter are astringent (sulphate of zinc, acetate of lead), or simply protective, like bismuth and silicate of potassium. All these injections have been accused of causing stricture, but the French writer declares it as his conviction that the duration of the flow more than the nature of the treatment contributes to the formation of consecutive strictures.

In a first series of clinical experiments, Martin, following the precepts of Fournier, treated all the patients of his army corps for a fortnight with local and general baths, emollient, mucilaginous drinks, bicarbonate of sodium, etc.; and it was not till during or at the end of the third week, when the discharge and micturition were without pain, that he began the use of copaiba, alone or associated with cubebs, and injections of sulphate of zinc,—one grain to the fluidounce, from one to five injections a day, in an increasing ratio up to five injections, then in a decreasing ratio back to one injection a day. During the stationary period the zinc injections are well borne, and seem to favor the action of the balsams; the latter were not always prescribed, but in all cases a mild and cooling dietetic regimen and the use of emollient drinks preceded the employment of the injections. The following are the statistical results of this method. The average duration of the treatment is based on the number of days spent at the infirmary or hospital.

Number of cases of blennorrhagic urethritis.....	62
Days of treatment.....	1684
Average duration.....	27.16

These figures agree to the fraction of a unit with the statistics of the Arzew Hospital, which, out of one hundred and thirty cases, give the average duration as 27.26 days. Since 1884 Martin has invariably had recourse to antiseptic agents in the treatment of acute blennorrhagia. He makes use of the three following formulæ, the preference being given to the $\frac{1}{20000}$ solution of bichloride of mercury:

1. Sulphate of quinine, 1 part;
   Glycerin, 25 parts;
   Distilled water, 75 parts;
   Acid sulphuric, q.s. to dissolve.

The above is a one per cent. solution.

2. Van Swieten's solution of bichloride of mercury, 10 parts;
   Distilled water, 190 parts.

The above is a very weak solution of the bichloride, 1 to 20,000.

3. Permanganate of potassium, .05 (1 grain);
   Distilled water, 100 (℥iii to ℥iiss).

The treatment is begun the day when the patient first presents himself at the hospital for treatment,—*i.e.*, generally from the second to the sixth day after the commencement of the discharge. Three injections a day are made, three syringefuls at a time. The injections are tepid, and tepid fomentations are kept continuously upon the penis. The injections are made with great gentleness. When the flow begins to dry up, the number of injections is decreased, till finally but one injection a day is made. The patient is kept in the hospital one week after cessation of all treatment, and is not discharged till he is believed to be absolutely well. The following table gives the results of treatment by antiseptic injections:

Agents employed.	Cases treated.	Days of treatment.	Average duration.
Sulphate of quinine (1 per cent. solution).	10	296	29.6
Permanganate of potassium (1 per 2000 solution).	47	1281	27.25
Bichloride of mercury (1 per 20,000 solution).	45	953	21.17
Total.....	102	2530	24.71

From the above, it will be seen that we have an average duration of 24.71 days, as contrasted with 27.16 where the treatment was according to the older "classic" methods.

It will be seen, too, that of all the agents employed, the sublimate injections gave the best results, the average duration of the disease, when treated by this antiseptic, being 21.17.

Antiseptic injections can hardly be said to constitute a "new treatment" of acute blennorrhagia, except in the fact of their application from the very commencement of the disease, and to the exclusion of all other treatment. It is surprising to see how little pain they occasion, even during the so-called inflammatory period, and they seem to produce rapid amelioration in the intensity and nature of the discharge. According to Martin, this treatment is much less liable to be attended with complications, such as orchitis, cystitis, prostatitis, than the ordinary treatment, and he presents statistics to prove his affirmation.

During the antiseptic treatment no special care about diet seems necessary. Sometimes full doses of bromide of potassium (60 to 90 grains) prove a useful adjuvant, especially in cases of "exaggerated erethism;" an occasional injection of ⅛ of a grain of morphine in the lumbar region may be indicated. In cases complicated with chordee, lavements or suppositories containing 15 grains of chloral sometimes give excellent results.

In cases complicated with cystitis, orchitis, or prostatitis, the microbicide injections are to be suspended to give place to emollients and sedatives.

It is worthy of remark that the results of the germicide treatment, as given by Martin, are much inferior to those claimed by some other authorities, notably Bourgeois, Chameron, and Constantin Paul.

The conclusion that patients are perfectly well at the time of discharge from hospital in these cases deserves notice. Nothing is stated in the article to show that any unusual care is taken which would warrant such a conclusion. There is nothing to show that in these patients a thin, transparent, gleety discharge does not appear, as in other patients, a short time after their return to duty. It is not easy to determine that a given patient is actually cured of gonorrhœa. The optimistic views of Dr. Martin need to be balanced by more philosophical and scientific views, such as those advanced by Drs. Bryson and Burnett in the *Journal of Cutaneous and Genito-Urinary Diseases*. These authors confirm previous observation that the gonococcus of Neisser persists in some cases after all discharge has ceased, and thus acute symptoms may be lighted up by any undue excitement.—*Boston Medical and Surgical Journal*, May 2, 1889.

TREATMENT OF RHEUMATISM.

At the meeting of the Clinical Society of Manchester, held April 16, 1889, Dr. W. N. Maccall read a paper on the treatment of the various forms of rheumatism (*British Medical Journal*, May 4, 1889). After reviewing the previous treatment of acute rheumatism during the last twenty-five years, Dr. Maccall considered the value of the present routine treatment by salicylic acid and its allies or derivatives under the following headings: 1. In relieving pain and lessening fever in acute rheumatism, the salicyl treatment was undoubtedly the most effective known. 2. The salicylates did not prevent the rare complication of hyperpyrexia, and were absolutely useless in its treatment. 3. It was doubtful if they prevented endocardial or pericardial troubles, the percentage remaining about the same (fifty per cent.) since the salicyl treatment as before. They seemed to have no influence in curing these troubles when they did occur. 4. There was no proof that the salicylates prevented relapse. 5. It was not proved that the salicylates lessened the duration of the disease, nor that they prevented anæmia. With regard to the particular form of the remedy, most writers recommended, and Dr. Maccall agreed with them, salicylate of soda in 20-grain doses at first every hour for three or four hours, according to circumstances. It should be continued in diminishing doses for at least eight or ten days after all pain and pyrexia had ceased, and in most cases should be followed by iron. Salicylic acid, salicin, and salol might be tried in exceptional cases where the soda salt was not well borne. In young children, antipyrin might be substituted with advantage. In convalescence, Sir A. Garrod's alkaline mixture, followed by iron, was advised; and if any joint remained stiff or swollen, blistering or painting with iodine was useful.

NETTLE-JUICE IN THE TREATMENT OF HEPATIC COLIC.

In the *Revue Générale de Clinique et de Thérapeutique* for April 4, 1889, Dr. Huchard refers to the juice of the nettle (*Urtica dioica*) in the treatment of biliary lithiasis. The fresh nettles should be crushed in a mortar, and a wineglassful of the juice taken in the morning while fasting. According to Dr. Masbrenier this treatment, if persisted in for a month, will prevent the return of hepatic

colic. If this treatment possesses any value it is doubtless to be attributed to the presence in the nettles of the nitrate of potassium and the carbonate of ammonium.

A DIAGNOSTIC SIGN OF TYPHOID FEVER.

The following particulars of a very remarkable aid to the diagnosis of enteric fever, contributed by DR. HOWARD TAYLOR to the *Lancet* for May 4, 1889, can hardly fail to be of value to the profession; the more so that many cases of this protean malady are extremely atypical, so as to be very difficult, or even impossible, of diagnosis; while obscure cases of other diseases are continually arising which so closely resemble typhoid fever that one cannot express any certain opinion as to their nature. By the aid of this additional sign it is claimed that one is able either to arrive at a more definite diagnosis, or else to exclude typhoid fever in not a few of such cases; when, but for this additional evidence, the nature of the patient's illness must have remained either altogether, or at least for some time, a matter of doubt.

In the year 1882, Dr. Ehrlich announced the fact that the urine of patients suffering from typhoid fever gives a reaction—with one of the aniline derivatives—different from that of normal urine and from the reaction of the urine of patients suffering from other diseases.

His test solutions are as follows: *A*, a saturated solution of sulphanilic acid in dilute (1 in 20) hydrochloric acid; *B*, a .05 per cent. solution of sodic nitrite in distilled water. (Both of these solutions must be fresh, especially the latter, which cannot be depended on for more than a week at the longest. When they are mixed, of course, a solution of sulphanilic acid containing free nitrous acid is produced, which is the actual test solution; but, on account of the extreme instability of the latter, the two solutions must be mixed fresh at each testing). In using the test, about 25 parts of *A* are added to 1 of *B*. Mix with this an equal bulk of the urine to be examined, and render alkaline with strong ammonia.

It is thus seen that the test referred to by Dr. Taylor is not a new one, and it could scarcely seem that a fact which has been known so long and used so little could be of great value. Dr. Taylor, however, states that, at the request of Dr. Sansom, he applied it to a large number of cases with the following results:

With normal urine, the only change which ordinarily occurs is a mere deepening of its color to a sherry or vinegar brown. In conditions of pyrexia other than typhoid fever the color also deepens, but still remains merely brown, although usually it becomes of a darker tint than the average color given by normal urines. But when the test is applied to the urine of a patient with enteric fever, the color rapidly turns red, the exact tint it acquires varying from the yellowish-red of bichromate of potassium solution, though ruby-red, to a rich port-wine color. On shaking the test-tube a froth is produced, which has usually a delicate pink color that is very characteristic.

Such is the reaction; now as to its limitations. In the first place, it is not *always* given until the latter part of the first week; but as the case frequently does not come under observation till then, this does not greatly limit its usefulness. And again, after the morning temperature has once reached normal during the intermittent stage (usually in the fourth week) it may—though it frequently does not—cease to be given.

Dr. Taylor adds that, as far as his experience has gone, the reaction is present during a great part of the febrile period, *in every case*. It is this which constitutes the great value of the test.

If it had been found—as one could have wished—that typhoid fever was unique in this respect, the test would have been by far the most reliable sign we possess, as being the only invariable one. But, unfortunately, *in exceptional cases*, the reaction is given in other diseases. Herein lies its weakness. However, while in most diseases it is a more or less rare exception, it seems to be an invariable (or almost invariable) rule in enterica. Occasionally, even in the urines of healthy subjects, a slightly reddish color is developed; but this is *very* rare, and the redness is hardly ever well marked; indeed, the deep rich crimson which is given in so many cases of enteric fever never being produced.

Apart from conditions of pyrexia, Dr. Taylor states that he has notes of cases of Bright's diseases, both acute and chronic, which gave this "typhoid reaction;" indeed, in albuminous urines he has found it more frequently than might be expected; but with this exception it is extremely rarely given by the urines of patients whose temperatures are normal. Thus, out of a large number of cases of valvular disease of the heart, it only

occurred in one in which hysteria was well marked. In chorea a slight reaction was given in one out of six cases. In two cases of diabetes mellitus and one of diabetes insipidus the reaction has not been given on any occasion. In febrile diseases it seems to be especially common in measles; while in acute tuberculosis, which of all diseases perhaps most often simulates typhoid fever, it has been absent in each of several cases that he has examined. In acute and advanced chronic phthisis reaction has been obtained in a few of a good many cases, but in the ordinary cases of this disease it has not been detected. In cases of lobar and of lobular pneumonia none of the urines have turned red. In only two of a large number of cases of acute rheumatism has the reaction been present.

From the above facts it would seem that the following conclusions can be drawn from Ehrlich's test. The absence of the reaction is practically proof positive that the case in question is not one of enterica (provided that the disease has lasted six days or more, and that the temperature has not yet fallen to normal). Its presence suggests—but does not prove—that the case is one of typhoid; the probability being greater the deeper the tint produced. And as the other diseases in which it occurs least rarely are not those which most closely resemble typhoid fever, but the reverse, the significance of these exceptions is very greatly diminished.

PERCHLORIDE OF MERCURY AND CANNABIS INDICA IN DYSENTERY.

In the *Indian Medical Gazette* for March, 1889, Mr. Matthew D. Moriarty states that after noting the great value of perchloride of mercury in many cases of diarrhœa, he was induced to try it in acute dysentery, and the results were highly satisfactory. He likewise states that some time ago he gave cannabis indica a short trial in the treatment of dysentery, but at that time found little or no benefit from its use. Recently, he writes, he tried it again against the perchloride, with the result that in some cases it appeared to be of considerable value, while in others it was quite ineffectual. At this time some cases occurred which did not yield readily to the perchloride treatment, and he found that an addition of ten minims of cannabis indica to each dose of the perchloride mixture was in each of these cases followed by rapid improvement and cure. The form in which he prescribes it is half a drachm of the solution of perchloride of mercury, ten minims of cannabis indica, in an ounce of tragacanthia mucilage. This mixture is given from four to eight times daily, according to the urgency of the case.

THE EMETIC PROPERTIES OF THE MEADOW DAFFODIL AND THE BARK OF THE ELDER-TREE.

The meadow daffodil, although but seldom employed as a drug, possesses marked emetic properties; its infusion has an agreeable taste, and readily produces vomiting in both adults and children. It may be prescribed in the form of a decoction of sixty grains of the narcissus in five ounces of boiling water, sweetened with sirup. The bark of the elder-tree in the fresh state likewise possesses cathartic and emetic properties, which, in certain cases, may be utilized to advantage. Dr. Bastoki recommends the decoction of seventy-five grains of the fresh bark of the elder in an ounce and a half of water. Dr. Huchard, who contributes these facts to the *Revue Générale de Clinique et de Thérapeutique* for April 4, 1889, states that while he has had no personal experience with the emetic properties of the bark of the elder, he has frequently employed the infusion of daffodils with marked success.

BROMIDE OF POTASSIUM IN OVARIAN ACNE.

In the *Practitioner* for May, 1889, Dr. Arthur Jamison writes that he has seen many cases of acne coincident with, if not caused by, ovarian irritation and its attendant menorrhagia. He reports one very striking case in which the bromide of potassium was used with the idea of relieving profuse menstruation; but, in addition to accomplishing this result, it produced a very surprising improvement in the condition of her skin, which was before the seat of an unusually marked form of acne. He prescribed 20 grains of potassium bromide, in infusion of gentian, three times a day, and, with the disappearance of the profuse menstruation, there was almost complete cure of the acne. Dr. Jamison thinks that this case, which he says is similar to four others which he had under his care, shows that constitutional remedies are in many cases preferable to local measures, and he concludes that among the causes of acne

in women ovarian congestion is one, and when acne is due to that cause potassium bromide is at present our most efficient remedy.

THE ACTION OF MORPHINE ON THE UTERUS.

About three years ago DR. LUTAUD reported to the Société de Médecine de Paris some observations which drew attention to a hitherto unnoticed symptom of chronic morphinism. The author showed that morphine has a special elective action on the ovaries, and that it either diminishes or causes the disappearance of the menstrual function according to the quantity of the poison absorbed. In the *Revue Générale de Clinique et de Thérapeutique* for May 2, 1889, he adds a number of additional facts, on which he bases certain conclusions as to the therapeutic indications for the use of morphine in this connection. He states that he has observed complete suppression of the menses in eighteen cases of women addicted to the use of morphine, all of whom had commenced the use of morphine as a consequence of more or less serious uterine disorders. As a consequence of the fact that suppression of menstruation was produced by morphine, Dr. Lutaud was lead to test the use of morphine in various affections, such as fibrous tumors of the uterus which were aggravated by menstruation, and he states that he has employed morphine in cases of uterine cancer and of fibrous tumors with very satisfactory results. He reports a number of cases which seem to warrant his conclusion that, since morphine suppresses menstruation, it may be employed with profit to combat uterine hemorrhages of nearly all varieties.

THE MOVEMENTS OF RESPIRATION.

DR. MAX MARCKWALD has recently published an elaborate monograph on the movements of respiration, with an account of their innervation, which has been translated by Mr. Thomas Arthur Haig, published in London by Blackie & Son. This essay contains so many new facts, and the author's conclusions are of such general medical interest, that we publish in full the summary of his results.

"1. In the *medulla oblongata* there lie in close connection with the roots of the vagus the centres of respiration: a centre of inspiration and a more difficultly excited centre of expiration. During normal respiration the centre of inspiration alone is active, while the centre of expiration becomes active only under exceptional circumstances. It is an auxiliary centre of respiration.

"2. There are no centres of respiration situated higher in the cerebro-spinal axis. All phenomena which have suggested the existence of such a centre can easily be explained as centripetal stimulations of the *medulla oblongata*, which, by reflex action, act on the respiratory centre in the fourth ventricle. The manner in which head-dyspnœa takes place and disappears is a fact against the existence of higher situated centres.

"3. In the cervical part of the spinal cord there are only the central tracts of respiration; special centres for the liberation of respiration do not exist there.

"4. The respiratory centre in the *medulla oblongata* not only acts automatically, but can be excited by reflex action.

"5. The automatically active centre can only liberate respiratory spasms, not regular rhythmic respiratory movements.

"6. Normal rhythmic respiration is a reflex act, mainly liberated by the vagi, which prevent the gathering tension in the centre becoming too great, and convert the inherent stimulations of the respiratory centre into regular respiratory movements. The action is that of a 'discharger.'

"7. The vagi constantly stimulate; they possess tonus, and are sufficient to serve as the only active regulators of respiration. During absolute rest of the animal organism they probably act alone.

"8. Next to the vagi the upper brain-tracts are of great importance for the liberation of the regular rhythmic respiration. They are capable of replacing the non-activity of the upper tracts. During sleep, during hibernation, or after certain narcotics the reflexes from the upper tracts on the respiratory centre often remain active.

"9. If a portion of the upper tracts remains non-active while the vagi are still active, then periodic respiration may take place (Cheyne-Stokes's respiration).

"10. For the accomplishment of the periodic respiration a change in the excitability of the respiratory centre itself is not necessary. The latter can be excited during periodic respiration at the time of the periods as well as during the pause, equally powerfully by means of weak shocks of the same strength.

"11. The sensory nerves of the skin can-

not take the place of the brain-tracts or of the vagi.

"12. While the cutaneous sensory nerves in animals which are intact exercise very gentle, perhaps almost no, influence on the respiratory centre, this influence increases greatly after the brain-tracts become non-active. In these circumstances, skin reflexes are capable of liberating complete series of respiratory movements. The cutaneous nerves possess no tonus.

"13. The centripetal nerves, which have an inhibitory action on the liberation of respiratory movements, as, for instance, the *trigemini*, *laryngei superiores*, and *glossopharyngei* possess no tonus, and must be regarded as auxiliary nerves of respiration; during normal liberation of respiration they are not in activity.

"14. The *trigemini* and *laryngei superiores* (as well as olfactory and splanchnic nerves) on stimulation cause slow respiration, and at last stop it altogether in a position of expiration, while the *glossopharyngei* have no influence on the frequency of respiration. The action of the latter is always an absolute inhibition of respiration, and this in every phase of the same in which the stimulation becomes active.

"15. A single electric shock cannot of itself set the respiratory centre into activity, but only when its action is strengthened by other (intracentral chemical) stimulations.

"16. The shortest irritation of the respiratory centre that can be caused sends to the phrenics four active, simple shocks, at intervals of about one-twentieth of a second.

"17. The normal stimulation of the respiratory centre does not depend on the blood; neither from deficiency of oxygen nor from too large a quantity of CO_2 in the blood. Animals continue to breathe without a circulation, and, after bleeding, for a considerable time.

"18. The Hering-Breuer mechanical respiratory theory is just as far from being correct, because after opening of the pleural sacs, and even after extirpation of the lungs, rhythmic respiration continues.

"19. The active stimulating matters of the respiratory centre itself are probably of a similar nature to those which stimulate the isolated heart; perhaps the products of decomposition of intercellular fluids.

"20. Apnœa has nothing to do with the gas contained in the blood, but depends probably on the removal of the stimulations stored in the centre, by means of the vagi in a state of tonus. Therefore, after section of the vagi, the production of apnœa is difficult, and it lasts only for a short time.

"21. During apnœa one can neither, by means of direct stimulation of the *medulla oblongata* nor of the central vagi, liberate respiratory movements.

"22. The respiratory centre of the fœtus, during respiratory rest in the uterus of the mother, is in a condition of much lower excitability than after birth.

"23. When central or peripheral stimulations during the act of birth have once caused respiration, then the continuously-stimulated respiratory centre does not readily lose the stimulating impulse, and respiration goes on in a regular rhythmic manner.

"24. Different phenomena, as the common salt dyspnœa and the cold dyspnœa (heat dyspnœa?) make it probable that the phrenics carry stimulations direct from the surface of the brain, from a motor centre in the same, evading the respiratory centre in their passage downward.

"25. The presence of the sensory fibres in the phrenics, as well as the extremely delicate muscular sensation referred to the diaphragm, support this view.

"26. Rabbits, from the age of 4 to 5 months, after division of the phrenics, may live; younger ones die from insufficiency of air, in consequence of incomplete expansion of the thorax."

THE PHYSIOLOGICAL PROPERTIES OF THE ANILIDES.

In the *Revue Médicale de la Suisse Romande* for April 20, 1889, is a partial report of a series of researches made by M. BINET as to the physiological properties of certain anilides. This group has recently furnished numerous additions to therapeutic substances, acetanilide, benzanilide, phenacetin, and methylacetanilide, the latter being described under the name of exalgine in our last issue. These substances are as closely allied in their physiological as in their chemical affinities. They paralyze the motor power, arrest the heart, reduce hæmoglobin, and are eliminated through the urine after being transformed into anamido-phenol. They all reduce temperature. The different principles vary in the character of their action on the nervous centres; thus formanilide produces torpor, and in highly toxic doses fibrillary contraction; methylacetanilide produces epileptic convulsions and collapse. Binet further draws

attention to the fact that the toxicity of these substances augment with their molecular weight.

HEART COMPLICATIONS IN GONORRHŒA.

According to the Vienna correspondent of the *British Medical Journal* for May 11, 1889, DR. A. GLUZINSKI, in a recent number of the *Przeglad Lekarski*, gives some interesting details with respect to affections of the circulatory organs depending on gonorrhœa. The frequent occurrence of joint affections in connection with gonorrhœa had long been known, whereas complications connected with the serous membranes of the internal organs, such as that of the heart, were unknown till recently. Brandes, in 1854, first published two cases in which gonorrhœal rheumatism was followed by endocarditis and pericarditis respectively. Sigmund observed two cases of gonorrhœal rheumatism of the joints in women, with subsequent pericarditis. Since 1872 the number of observations became larger and larger, so that Dr. Gluzinski had found records of thirty-one cases. The following conclusions might be derived from these observations: 1. Pericarditis, as well as endocarditis, might supervene in the course of gonorrhœa. 2. These complications might develop after gonorrhœal rheumatism, but also without the presence of such an affection. 3. The complaint often assumes the character of a severe infectious disease, as in endocarditis ulcerosa, runs an acute course, and sometimes gives rise to failure of the heart. The fact that, of the thirty-two cases published, in only two were the patients women, might be explained by the suggestion that in the case of acute rheumatism in the female sex the presence of a simultaneous gonorrhœa was less frequently inquired for. As to the causal connection of the affections of the heart with the urethral affection, Dr. Gluzinski argued that it must not be supposed that these complications were analogous to orchitis or cystitis set up by extension of the inflammatory process *per continuitatem* or *per contiguitatem*. Dr. Gluzinski thought the following the most probable explanation. Since the discovery by Neisser of the gonococcus, which was the pathogenic micro-organism of gonorrhœa, the synovial fluid in cases of gonorrhœal rheumatism of the joints has been repeatedly examined for specific micro-organisms. Different results have been obtained by different investigators. Some, who believe they have discovered a specific microbe, consider the rheumatism to be a direct result of the gonorrhœa. Others, again, who have failed to find gonococci or other pyogenic micro-organisms in the synovial fluid, regard this affection as a secondary one due to the penetration of pyogenic micro-organisms, owing to a lesion in the urethral mucous membrane. It was very probable that the same organism, after it had got into the circulatory system, produced in the serous membranes of the heart affections analogous to those in the joints. This hypothesis was confirmed by the case published by Weichselbaum. In that case gonorrhœa was complicated with endocarditis and cardiac failure, and the streptococcus pyogenes was proved to be present in the vegetations on the valves. Dr. Gluzinski said that complications did not always occur in so acute a form as the endocarditis ulcerosa or pericarditis acuta. In eight cases which he had observed, these complications were of a very mild character. The patients complained of "stitch" in the left chest and palpitations of the heart. There was accelerated and increased action of the heart, and frequently also a slight pericardial crepitant râle. In spite of the most careful examination, no other affection could be detected but gonorrhœa. These cases mostly ran a rapid and mild course, and might very easily be overlooked. They deserved the greatest attention, however, as endocardial murmurs and cardiac failure came on in two of these cases. In the majority of these cases rheumatism was either quite missed or came on after the cardiac affection had set in. In all these cases there was gonorrhœa of long standing. Gluzinski concluded that just as acute affections of the heart occurred in acute gonorrhœa, mild diseases of the serous membranes of the heart could also supervene in the course of chronic gonorrhœa.

BROMIDE OF SODIUM IN INTOLERANCE FOR QUININE.

KRASTILEVSKY states in the *Internationale Klinische Rundschau* for May 12, 1889, that he recently had under his care a young girl suffering from intermittent fever, in whom quinine, even in extremely small doses, produced marked erythema. This intolerance for quinine was overcome through the simultaneous administration of bromide preparations, the best results being obtained through the use every two hours of a dessertspoonful of a two and a half per cent. solution of bromide of sodium. This entirely prevented the occurrence of erythema after the administration of quinine.

Reviews.

THE PSYCHIC LIFE OF MICRO-ORGANISMS. A STUDY IN EXPERIMENTAL PSYCHOLOGY. By Alfred Binet. Translated from the French by Thomas McCormack. With a preface by the author, written expressly for the American edition.

Chicago: The Open Court Publishing Co., 1889.

This book provides, after a fashion, an antidote to the teachings of modern science in regard to inferior life. The author might just as well have called his work "The Loves of the Infusoria." And his whole aim is to excite rather than prove the idea that there is volition, like human volition, sexual instinct, and selective effort, as far down in the scale of inferior life as the eye of man, aided by the microscope, can pierce. To many who have thought but little about it, who have never investigated the matter personally, and to whom the recent discoveries of the microscopist are all an unknown field, the book well seems but a fairy-tale or a scientific hoax; but throughout his deductions and inferences the author has the strong support of recent observations. True, he has massed together the work of many observers, and has drawn obvious deductions where others have but recorded what they saw; but we think that he has quoted fairly from his authorities, and the reader is at liberty to arrive at other conclusions if he can.

"Psychic life" is soul life, and the author would lead us to believe that not only do we and the higher animals possess the mystery of a soul, but that we share it with the spermatozoid and the ovum. Not only do we and the higher animals, vertebrate and invertebrate, feel the sexual passion, but such little atoms as the paramœcium aurelia and the chilodon encullulus feel it also. Well may a recent poet write—

> "We are greater, my bacilla,
> Than all monarchs; for me seems
> We need but exist to fill a
> Strong man's brain with fever dreams.
> Such the thought my passion kindles,
> Oh, my microscopic bride!
> Kiss me! Although twenty Tyndalls
> Have their eyes upon the slide."

Really, it almost causes the most hardened cheek to blush as one reads the graphic description of fertilization of star-fish. The struggle of the spermatozoids, the successful arrival of the most vigorous, the advance of the ovum to meet it, and the fusion of the two elements in mysterious union, seem but the repetition, far below the line of ordinary "mortal ken," of the sexual union of the maturer animals to which they belong. It seems a mimic reproduction of the whole matter, and brings us many steps nearer to the solution of the one great question of the living world. Many steps nearer, yet, perhaps, practically as far off as ever. It seems to the reader, however, like the last step on the threshold of Isis's temple, the last step before the impenetrable veil.

Has the reader ever considered the astounding life-history of the spermatozoid, his determination and fixed purpose to go in one direction only, the actual length of his journey, if compared with his own insignificant size, the obstacles before him, and wondered what could lead him on so unnerringly? The author thinks the question already answered. The spermatozoid is created with an inordinate fondness for certain chemical substances, which vary with the different species of germ in question. Thus, for the spermatozoids of the confervæ cane-sugar is the seductive allurement. No glucose or saccharin, no modern sophistication, will suffice. He wants the pure article, and his ovum affords a supply. A touching instance of the fondness for sweets, so common in the human infant. Can it be, sweet thought, that the longing for lollipops is a basic instinct, capable of leading us, on investigation, to the secrets of life and our own origin? If we are developed from a primoidial cell, perhaps we did not all start from the same one. Now, Pfeffer finds that the spermatozoids of the pteris serrulata and others are incited by malic acid,—the acid of the apple. Does this point to a deeper meaning in the story of Eve and her temptation? The ovum offers the malic acid to the male spermatozoid. Further comment is unnecessary.

And so real is this matter that the author describes and urges the use of a "spermatozoid test" of the purity of certain substances. In sugar, for instance, it would do away with the spectroscope, and for cider and pure cider vinegar now; but, alas! the eels would make short work with the puny reagents.

The author—to his own satisfaction any way—traces the beginning of soul life to protoplasm. Protoplasm sees and hears, exercises volition and love, can feel and manifest also the passions of anger, envy, disappointment, can make mistakes, blunder into wrong paths, retrace its steps, be frightened, flee away, lurk in hiding from a more powerful enemy,

or in ambush for its prey, can attack and repulse attacks; in short, can be proved to do all that man and the higher animals can in the way of volitional life. But he has not yet succeeded in accrediting to its "consciousness" the beautiful but chance flower of evolution. But by his own line of argument that is but a question of time and research, or of our own limited powers of observation, for he proves that, as all life originates from protoplasm, so protoplasm must contain in itself, even if in embryo, all of life. All the powers that unfold, as we mount the scale, have, of necessity, been locked up in the original cell, so that the stentor may, for all we know, be capable of meditating upon his own bart bulle, and the "podophrys fixa" may wonder why he should be born to succumb to the coleps hirtus. In fact, viewed through the author's (microscopic) glasses, the living world seems more mysterious than ever; and, to revert again to our poet, it is doubtless a field of vast amusement, for all we know, to the infusorial world to "see the necks"

> "Of these mighty men of science,
> Over the microscope bent low;
> While beneath them, in defiance,
> Spins the merry vibrio."

E. W. W.

THE MEDICAL ANNUAL AND PRACTITIONER'S INDEX. A WORK OF REFERENCE FOR MEDICAL PRACTITIONERS, 1889. Seventh year.
Bristol, England: Jno. Wright & Co., Stonebridge.
London, England: Hamilton, Adams & Co., Paternoster Row.
New York: E. B. Treat.
Toronto: J. A. Carvette & Co.

We take great pleasure in again noticing the "Medical Annual." If this were a voluminous, cut-and-dried compendium of extracts, it would not deserve the place it occupies, or the time it takes to read it; but this "Annual" is so full of live matter, and the dead limbs of last season have been so thoroughly pruned away, that it comes to the reader like a breath of fresh air medicated.

The volume for 1889 opens with a "Review of Therapeutic Progress for the Year 1888," by Percy Wylde, M.D., which is largely devoted to the topic of the primary and secondary action of medicines. The writer of this introductory chapter has evidently perused with interest Dr. Boardman Reed's article in the *Practitioner*. The seed has evidently fallen upon fertile ground, and the author gives us the entire question, with copious extracts. As for his own opinion, we find him writing, p. 6, "It would be useless to waste time in discussing in the abstract whether Dr. Reed's views represent a whole or only a partial truth. Clinical experience is the only test, and the illustrations which he gives, together with those with which recent medical literature abounds, are of more value than pages of theoretical reasoning." And further: "The question is one of great practical importance, for, if Dr. Reed's conclusions are correct, it opens a way of overcoming the great obstacle to therapeutic advance; it renders it unnecessary that we should wait until we know the exact nerve-centres, which arsenic and podophyllin depress, to cause diarrhœa, before we make use of them for its cure. All that is necessary is, that we should know by clinical observation the precise form of diarrhœa which each produces, together with their general effects on the patient, and it follows that a small dose will cure that form which most closely resembles the toxic effects of the drug."

But while admitting that Dr. Reed has some basis of fact on which to rest his published opinions, Dr. Wylde, in the article under consideration, goes farther, and traces these views of medicinal action back much farther than Dr. Reed has done. While Dr. Reed quotes Stillé and other recent authorities as giving a good ground for his work, Dr. Wylde goes farther back. He finds Claude Bernard putting it as an axiom that "every substance which in large doses abolishes the property of an organic element stimulates it when given in small ones." He traces it to Hippocrates, and in an essay published in *Hufeland's Journal* in 1796, on the "Curative Powers of Drugs," he finds "most medicines have more than one action. The first, a direct action, which gradually changes into the second, which I call the indirect secondary action; the latter is generally a state exactly the opposite of the former." So, we see that, whether these views are "whole truths or half truths," their original discovery is to be credited not to Dr. Reed, though undoubtedly original with him, but to an unknown therapeutist writing in the end of the last century.

We have devoted considerable space to this subject because it is one which has excited some discussion in the THERAPEUTIC GAZETTE and elsewhere, and because it is always possible that there may be some truth even in apparent error, and the office of the investigator is to discover for it rather than uphold theories. The real work of the book, however, is divided this year, as last, into the two sections of "New Remedies" and "New Treatment."

The list of new remedies (including the new applications of old ones) seems more brief than in last year's "Annual." The arrangement is alphabetical in both sections.

Acetanilide and acetphenetidin, agaricus and amylene hydrate have considerable space allotted to them. There is quite an extensive article on antipyrin, concerning whose action the author gives some new ideas and theories, which are worth attention. Throughout the book one cannot but see that the keynote was struck in the introductory on the double action of drugs. Take calcium sulphide. Of it we are told that "in full doses it increases the rapidity of suppuration in boils and abscesses, and in smaller doses will cause resolution where the suppurative process threatens but has not commenced." This drug is also recommended in leucorrhœa, in specific vaginitis, rhinitis, and catarrhal deafness. Cascara, and its claims in rheumatism, are discussed, but a long and patient trial of it has convinced the reviewer that the cases capable of benefit must be rare. Creoline is highly recommended in catarrhal inflammation as a local agent. Under veratrum viride we find the results of Dr. Christovich from weak solutions (one per cent. solution of the fluid extract), as given in the *Rev. de Cien. Med. de Barcelona.* 1. The drug increases the heart's contractions, strengthens its action, and increases the fulness of pulse. 2. A decrease in the heart's activity in cases of violent cardiac action. 3. Congestions of liver, lungs, and kidneys cured or improved. 4. Secretion of urine increased, and so on. The doses of the above solution given were 10 to 20 drops; and here, again, the author states that, if surprised, the reader can understand it better if he considers "that by using the weak solution only the primary stimulant action is obtained."

Under "Iodine," a case is given of vomiting after labor cured by 5 drops of the tincture in water. After discussing the case, the author sagely says, "This case might be taken by Dr. Boardman Reed as a happy illustration of his theory."

Under "Pyridine," the conclusions of Dr. De Renzi are given, the last of which is, "Pyridine has conquered angina pectoris."

The article on "Massage" is a thoroughly practical one, well illustrated. It is from the pen of Thomas Stretch Dowse, M.D. The Weir-Mitchell treatment is also considered at length. "Electro-Therapeutics" is contributed by Kenneth Millican, B.A. Cantab., M.R.C.S., and is an exceedingly practical, condensed article on the subject.

In the section on "New Treatment" the volume is rendered more valuable by a condensation under each topic of the new treatment for the same condition as given in the volumes for 1887 and 1888, with page references. This enables one at a glance to see all the valuable suggestions of the preceding three or four years under their appropriate topic. We feel sure the readers of the "Annual" will coincide with us in thinking that, whether heretical or orthodox, the "Annual" is a live, useful book, and deserves a place in every library.

E. W. W.

AN ELEMENTARY TREATISE ON HUMAN ANATOMY. By Joseph Leidy, M.D., LL.D. Second edition. Philadelphia: J. B. Lippincott Company, 1889.

We have carefully looked over the above work, and the result has been that we are forced to one conclusion,—it is that its excellency is such as to leave no place in our mind for anything but praise. The number of years that Dr. Leidy has been engaged in teaching medical students human anatomy must eminently qualify him for the authorship of such a volume. The clearness of his descriptions, the manner in which difficult and obscure points are rendered easily understood, and the very apt explanations to impress facts upon the students are all evidences of his ability and suitableness for the task.

In making a comparison of the present edition with the first edition of Dr. Leidy's book, which was published twenty-eight years ago, it is seen that the above volume is, indeed, a new work. The size is increased from 663 to 950 pages; the illustrations from 392 to 495, and the entire context is rewritten. The progress and changes made in this branch of medical science during so many years have been considerable, but nowhere do we find that the author has omitted to give us the most recent views. More especially is this noticeable in the sections relating to microscopical anatomy, so that the descriptions and illustrations of the histological structure of the tissues are very materially different from those given in the first edition. A conspicuous feature in the first edition of Dr. Leidy's book was the adoption of a plan to simplify the nomenclature, and he employed single names, "those most expressive of the character of the part; and, when admissible, the name is anglicized." This feature is, and,

we think, properly, even more prominent in the present edition than it was in the former; and, in our opinion, it alone is one among other many good reasons which should induce teachers of anatomy to adopt this work as a text-book.

Correspondence.

PARIS.

(From our Special Correspondent.)

New Names for Copyrighted Medicines — Bismuth Citrate in Syphilis — Is Cancer Contagious? — A Monument to Dr. Auzoux—Completion of Dr. Dechambre's "Cyclopædia" — Medical Graduates decreasing in Number—The Therapeutical Congress —American Soldiers at the Exposition—The Eiffel Tower made Useful.

Quite a controversy is now raging in respect to the name of some new medicaments, chiefly chemicals of coal-tar origin. Both therapeutists and pharmacists, who are most interested, take a hand in what may properly be called a tourney of words. The trouble is about medicine of the antipyrin type, and the quarrel is a very pretty one as it stands. Most of these chemicals have been discovered in Germany, and, the French claim, owe their popularity to therapeutical researches made in France. As French law forbids the patenting of any medical compound, German inventors gave their chemicals fancy names and copyrighted the appellation,—a procedure not unknown in America,—and thus secured, for the time at least, a monopoly, which French pharmacists consider an evasion of the law and try their utmost to defeat. The fact is that, national rivalry being set aside, it is vexing to see foreigners obtaining by clever device a privilege denied to natives. The courts have been appealed to, but law's delays are the same here as elsewhere, so that in the mean time some means have been looked for to shake off the incubus. As the doughty Dr. Knorr holds fast to his copyright of the word "antipyrin," pharmacist Bourgoin, the director of the hospitals' central pharmacy, and a member of the Academy of Medicine, recently proposed that henceforth the compound be known under the name of "analgesine," and the Academy accepted his suggestion, recommending to all physicians to prescribe it as such. Unfortunately, the idea, a good one in itself, was in practice but a partial success, many doctors continuing to use the word antipyrin. Next, Dr. Dujardin-Beaumetz, as chairman of a committee appointed to this effect, reported to the Academy of Medicine resolutions, declaring (1) that the physician may prescribe medicines by their vulgar names, and the pharmacist may dispense the same and enter them in the prescription-book by their scientific synonymes; (2) the attention of the public authorities is called to the necessity of revising pharmaceutical legislation. The resolutions were carried (April 30) with only one vote in the negative. The reasons given in the preamble for the first resolution were that in the same manner as a pharmacist dispenses magnesia sulphate, and enters the name as such, when Epsom salt is prescribed, so may he, when antipyrin is ordered, dispense dimethyloxyquinizine; diethylsulfondimethylmethan for sulphonal; and so on for the whole tribe of copyrighted articles when the prescriber mentions no maker's name. In this manner the dispenser could procure the articles in open market without paying tribute to foreign monopolists. The second resolution is a direct corollary of the first, pharmaceutical trade-marks being left in great confusion by the present antiquated legislation. Then, at a sitting of the Academy of Sciences, Drs. Dujardin-Beaumetz and Bardet having presented a memoir on another coal-tar derivative — orthomethylacetanilide — discovered by M. Brigonnet and by him christened "exalgine," but by them studied clinically and found preferable to antipyrin, Professor Jungfleisch, of the Paris College of Pharmacy, emphatically protested against this and all chemical nicknames. The professor, who is a chemist of considerable authority, urged that, besides the danger of the word becoming the object of a copyright, to use such loose appellations is to go backward to the pristine nomenclature of alchemists with its numberless synonymes. Modern chemical names, he admitted, are—although chemists do their best to shorten them—often very complicated, but they indicate the composition of the substance. It would be a great service to chemists to show them how to still more simplify these names, instead of leading the way to more confusion and possible pharmaceutical errors. He begged all skilful experimenters, and especially his eminent colleague, Dr. Dujardin-Beaumetz, to help professionals to resist so baneful a tendency. In short, Professor Jungfleisch pronounced against "exalgine," in favor of orthomethylacetanilide. To this Dr. Bardet has replied that, since chemists began to introduce in therapeutics compounds with such intricate names, physicians and

pharmacists have found themselves obliged to designate them by a less barbarous assemblage of syllables. It may be less correct, but it is more practical. If Dr. Dujardin-Beaumetz and he have been using the word exalgine (from the Greek words *ex* and *algos*), it is because when they first studied it it was thus presented to them, and its true chemical status was not fixed positively, there being some doubt as to whether it was an ortho-, a meta-, or a para- compound. As to the use of chemical nomenclature, he said, suppose a a physician were to prescribe the following:

℞ Diethylsulphondimethyl-methan, ʒi;
Trichloracetyl hydride, ʒss;
Alcohol, water, etc., q.v.

Admitting that there are physicians able to write such a prescription, how many pharmacists will there be found knowing that the two outlandish names conceal plain sulphonal and chloral? There is no reason why sulphonal should be excluded when chloral is admitted, as are iodoform and chloroform. It is just because chemists have not been able to supply us with current names that we are compelled to invent some ourselves, at the risk of choosing wrong ones. Besides, chemists themselves act likewise. Was not the word chloral used first by a chemist? Physicians cannot pretend to be wiser than chemists, Bayer, for instance, who shortened acetphenethydine to phenacetine, a designation which is scarcely more convenient, and does not show the composition of the substance. Not only are many chemical names impracticable and unintelligible to most members of the healing profession, but they may cause serious mistakes. To-day, for instance, we have ortho-methylacetanilide (for exalgine), but to-morrow one of its isomers—a meta- or para-, etc.—may be found to possess remarkable properties, although quite different. How are pharmacists to find their way in such a maze? As to the copyrighted names, that is a commercial question. The trade-mark can easily be evaded by following the instructions given in the Academy of Medicine resolutions. When a physician prescribes "sublimate," the pharmacist takes the product held in the bottle labelled "mercuric chloride." In the same way, when "antipyrin" is ordered, let him dispense it from his "dimethyloxiquinizine" bottle, and Dr. Knorr will have nothing to say. Only when Dr. Knorr's antipyrin is mentioned is his stuff to be dispensed. Probably the end is not yet, but the controversy is quite lovely as it stands.

It may appear rather late in the day, perhaps, to be now speaking of citrate of bismuth, yet something new is preparing here, which has not been mentioned in the papers so far. French practitioners, as the readers of the THERAPEUTIC GAZETTE probably know, still retain for soluble bismuth compounds some of the old mistrust felt, long since, when bismuth was considered medically as dangerous as lead, if not more so. Consequently, citrate of bismuth is seldom or never prescribed here, unless you prefer to reverse the statement, and say that, citrate of bismuth having never been tried, French physicians are in consequence much afraid of it. When they are told of the doses recklessly administered right and left in America, French practitioners first look incredulous, and when convinced that such is the actual fact, they will at once explain it away by replying that citrate of bismuth on reaching the stomach will be decomposed into an insoluble oxychloride, so that the compound on reaching the economy will, after all, be as harmless as the classic subnitrate. Whatever may be the correctness of this theory,—to most chemists untenable,—it has led some French experimenters to try citrate of bismuth hypodermically, with, it is said, marked results. The effects observed on animals have been such as to suggest the possibility of substituting bismuth for mercury in hypodermic injections for syphilitic diseases. According to private information given to your correspondent, experiments are now in progress at the Lourcine Hospital with soluble citrate of bismuth made after the American formula, and the results will be published when the investigations are completed.

Whether cancer is contagious or not, may be said to remain still a moot question. Dr. Arnaudet, of Cormeilles, in Normandy, has been collecting data which tend to prove that the disease may, under some circumstances, be communicated from one patient to another. In the little village of Cormeilles, with a population of four hundred in 1881, no less than eleven deaths from cancer, out of a total of seventy-four, occurred during the eight years elapsing from 1880 to 1887. So large a proportion for a comparatively infrequent affection is almost equivalent to an epidemic, and was all the more remarkable that the cancers were located in the stomach, neck, or mesentery, and carried off ten male

patients against one female. As compared with Paris, the whole mortality from this cause was not only considerably larger, but the proportion of sexes entirely different. The usual rate in Paris being fifteen female to nine male cancer patients, the mortality at Cormeilles may be set down at ten times that in the capital, which is considered to present a fair average. The unusual proportion of male deaths in the village is, according to Dr. Arnaudet, owing to the fact that while in the city the uterus is often the seat of the disease, at Cormeilles the cancer almost invariably located in the stomach, and never once in the womb. Other Norman towns, as inquiry from brother physicians proved, showed a similar state of affairs. On grouping together the cases, and comparing the circumstances, too long to be here related, Dr. Arnaudet has come to the conclusion that there is no doubt of the transmission of cancer from one patient to another, and thinks the contagion has, in the present instance, had for a vehicle the water from village ponds used for making cider, the popular drink in Normandy. Cider-drinkers have been shown by medical statistics to be remarkably free from stone and urinary calculi. The immunity would be dearly purchased if cancer in the stomach is to be the price, were it not that Norman peasants can easily escape the dilemma by mixing their cider with none but pure water.

A project is on foot to erect a monument to the memory of Dr. Auzoux, the inventor of the classic models now so well known in teaching medical colleges of America as well as Europe. His discovery of an extremely light and tenacious composition for moulding was the initial point of his work, but only persistent labor and patient investigation enabled him to reproduce living forms so well. Another item of news in connection with departed French physicians is the completion of Dr. Dechambre's "Medical Cyclopædia" ("Dictionnaire Encyclopédique des Sciences Médicales"). The first volume of this immense work, probably the most complete of its kind, appeared in 1859, and the one hundredth and last came out last week. On announcing the fact to the Academy of Medicine and the Academy of Sciences, Professor Verneuil paid a deserved tribute to the memory of his late friend and fellow-academician, and added that American and English subscribers had taken almost as many copies of the "Cyclopædia" as the French did. Dr. Dechambre died in 1886, but, wiser, or luckier, than Dr. Auzoux, left quite a comfortable fortune. While on the subject of current topics, it may interest professional readers on your side of the Atlantic to know that here the number of medical graduates is decreasing, quite the reverse of what occurs with you. According to official statistics, during the session of 1887–88 all the French faculties together conferred only 647 diplomas of doctor of medicine, a beggarly total, which is exceeded by almost any of the large American cities. Of the aggregate, Paris granted 373 diplomas; Bordeaux, 97; Montpellier, 91; Lyons, 48; Lille, 17; and Nancy, 16. This is apparently an increase as compared with the session of 1886–87, when 624 diplomas were conferred, but the contrary is the case, as in 1888 navy doctors, numbering 103, took their diplomas together, while formerly they were by law allowed several years for graduation.

During the Exposition a multiplicity of international congresses are to be held in Paris, and in most of them America will be well represented. Among the American patrons of the Therapeutic Congress, to meet on August 1, we find the names of Professors Wood, Robert Bartholow, and Meade Smith by the side of Drs. Fraser, Holmes, Burney Yeo, Lauder Brunton, and Paul, of Great Britain. The International Congress of Therapeutics, Materia Medica, and Pharmacology, to call it by its full name, might have obtained for the asking a fine hall in the College of Pharmacy, but its organizing committee preferred to hire a meeting-place at the Hôtel des Sociétés Savantes, 28 Rue Serpente. An exhibition of the drugs and natural products—strophanthus and the like—is to be provided in an adjoining room by MM. Adrian and Blondel, probably as a substitute for the extensive materia medica collection of the College of Pharmacy. But, after all, perhaps it was best for therapeutists to eschew both medical and pharmaceutical institutions, and to meet on neutral ground. Only they should not have allowed their reunion to overlap the Chemical Congress, which is to last from July 29 to August 3.

It is almost impossible to resist the temptation of saying something about a most untherapeutical subject,—namely, the Exposition. That it is a success, of course, you know; that it is much backward, you have no doubt been told. But it is hardly possible to imagine the kaleidoscopic variety, brilliancy, and charm of the immense fair. The American sections seem to attract most attention

and the largest crowds; and what is most admired is a collection of wax figures of life size representing some of the heroes of the Independence Wars. There the French recognize the old uniforms of their own army. And next to the mock soldiers, they admire most the live "boys in blue" sent by the United States as a compliment to the French republic. These are all fine, good-looking fellows, and for the present their only duty is to show themselves and to keep the public off the unfinished American sections. They smilingly tell you, "On ne passe pas!" in such beautiful French that you try to talk with them in the same language, when you find out that is all they know of the vernacular. But how well they know it! And, lastly, the Eiffel tower, that huge advertising monster, has been useful to sciences by enabling astronomer Janssen to prove—he thinks—that there is no oxygen in the solar atmosphere. Which shows once more that nothing is useless in this wide world.

PARIS, May 22, 1889.

BERLIN.

(From our Special Correspondent.)

For some time past surgery has been taking the lead of all medical sciences. One of its ablest followers aptly compared it with the advance guard of a great army. In its isolated position, during the days of Lister and Langenbeck, it has indeed accomplished wonders. Now, however, it is again returning to the shelter of the main force,—that is to say, surgery is again endeavoring to establish her connection with medicine in general, which during its rapid advance had to some extent been lost. Towards this end the tide of present investigations is carrying surgery, as the observer cannot fail to realize; and this fact is mirrored with special clearness in the results brought forward in the two great congresses held yearly in Germany and Austria, and which, to a great extent, represent the advance internal medicine and surgery have made during the year.

In our last letter we wrote you concerning the discussion which took place in the Congress for Internal Medicine of Wiesbaden, regarding the ileus question, and it now may not be amiss to give you an idea of how the surgeons have been endeavoring to answer this question.

Schede, of Hamburg, the chief of the largest surgical institution in Germany, elucidated at length and in every detail the treatment of ileus, and it was remarkable to note how, in many instances, his ideas coincided with those of his well-known colleague, Curschmann, the former chief of internal medicine in the General Hospital of Hamburg. Both formulated a similar programme, in which the theories of both surgeon and physician touched and showed a common ground where the sister sciences could meet and treat. Also in the Surgical Congress of Berlin, the treatment of ileus formed one of the most interesting themes of one of the sessions. Here one of Von Bergmann's assistants related his experiences and the material gathered in the Berlin Surgical Clinic. Here also an attempt was made to show the striking similarity of the results obtained with those of the clinic for internal medicine.

The surgeon no longer can grasp the knife without first having satisfied himself that the indications for operative interference are more clearly defined than heretofore. The lecturer, Dr. Schlange, divides the complex symptoms which we term ileus into two groups. The first of these includes those symptoms which from the outset have not been adaptable to surgical interference,—these are, first, cases of fæcal accumulation ending in extensive peritonitis, and, secondly, cases of intestinal paralysis arising from a misplacement of the bowels which is caused by ileus, resulting from some internal obstruction. In such cases the so-called "expectative" treatment, as described by Goltdammer in his lecture before the Medical Society of Berlin and also by Curschmann in the Congress for Internal Medicine (see Wiesbaden letter in last number of THERAPEUTIC GAZETTE), is clearly indicated. Laparotomies are justifiable in cases in which a mechanical closure of the bowel is evident. Primarily, however, this must be confirmed by a more exact diagnosis than has heretofore been possible.

To this end we will turn to the consideration of physiological experiments. The latest investigations of the Viennese clinician Nothnagel have brought us an important step forward. Nothnagel experimented upon rabbits, in which he ligatured high as well as low portions of the bowel in different animals, and then through the open abdomen watched the actions of the bowels. He found that the portion of the bowel below the ligature quickly contracted and speedily emptied itself of its contents. The portion above becomes quickly inflated, and peristaltic movements are ob-

served at intervals; after some time these movements cease. Form and movement are therefore the first important points to be considered in determining a reliable diagnosis. Increased filling of a large portion of the bowel in which occasional peristaltic movements may be recognized are therefore the principal points by the means of which an early diagnosis of intestinal obstruction may be obtained. The plainer one may see, as well as feel, single intestinal loops in the inflated abdomen, the surer one may be of the fact that the bowel has not yet become paralyzed. The paralyzed bowel loses its rounded contour, and the abdomen will assume the typical barrel-form or shape. So long as intestinal paralysis cannot be determined by these symptoms, laparotomy may be performed. Whether or no the operation is indicated in special cases must be determined by differential diagnosis, for, with the science at its present state, in most cases the diagnosis is only a probable one; all the same, there are certain cases in which a positive diagnosis may be reached. The results of these investigations have, however, by no means solved the ileus question, although it cannot be denied that we have progressed one step in the right direction, and also that the combined endeavors of surgeons and internal clinicians are undoubtedly advancing our knowledge of this complex subject.

A second and important province, in which both surgeon and physician can deal mutually and stretch forth a helping hand to each other in order to reach a satisfactory therapeutic result, is that of perforative peritonitis. Here also every surgeon whose operation in such cases has been attended with success must admit that the favorable results obtained must be credited to some unknown factor rather than his own skill, and others, again, must also admit that their surgical interference has only injured a number of cases, and hastened death. Here also we have to deal with a class of cases where a decided restriction must be laid upon surgical procedures, even though the condition of the patient be correctly diagnosed and therapeutic measures based upon purely empiric foundations are not justifiable.

The surgeon, Mikuliez, of Kōnigsberg, who has on many occasions contributed so valuably to surgery, has also given new ideas to the profession which are of great value. He addressed the Surgical Congress on this subject in a most interesting and instructive manner. Any classification of the different forms of peritonitis with reference to their points of origin Mikuliez does not attempt, as at present would be impossible. However, even with the science as it is to-day, we are able to define accurately from another point of view the various forms of the disease. They can be classified in two groups. The one group includes those cases which from the outset are accompanied by a diffusion. This Mikuliez calls *septic-diffused* peritonitis. By many authorities this form is not considered amenable to operative treatment, perhaps unjustly; all the same, it seems almost cruel to subject a patient who is in a dying condition and whose pulse is scarcely detectable to the ordeal of a laparotomy. The second class of cases are of a far more favorable nature. In these the secretion is fibrinous pus, and their characteristic feature is that they do not at once involve the entire, or even a very large portion, of the peritoneum, but progress either slowly or quickly from a certain point. Mikuliez gives this group the name of *putrid-fibrinous progressive* peritonitis. Long ago, however, physicians of internal medicine have endeavored to demonstrate to surgeons that operative interference in such cases only tends to change local peritonitis into general peritonitis. Mikuliez has not been blind to these assertions, but has based his method of treatment upon them. He opens the single points of the disease, which are situated between adhesions, and carefully avoids any tearing of the adhesions. In this manner, in one case, he operated upon six different points of inflammation through three separate abdominal incisions. It is important to abstain from disturbing the intestinal loops which are adherent to each other, and also to handle them as little as possible. It is also of greatest possible importance to most carefully watch the course of the disease in these cases and to have had the patient under close observation for several days, so that no point of disease can be missed at the operation. In cases in which the progress of the disease is not very acute there is no call for undue hurry. In one case, which Mikuliez operated upon in this manner and cured, two weeks elapsed between the first and second incision. One cannot, however, feel confident as to the patient's ultimate recovery until there is no longer any rise of temperature. So long as there is the slightest fever the patient must daily be subjected to a most careful examination, in order to trace the existence of any new points of the disease.

In his discourse Mikuliez also answered several questions relating to abdominal sur-

gery. One was, "Is it necessary to douche the abdomen, and with what should it be done?" In such forms of peritonitis antiseptics take no part; the exudations should be removed mechanically, and for this purpose a half per cent. solution of salt and water is all that is requisite. In irrigating, care should be taken not to use too forcible a stream. A second question is, "Are intestinal sutures necessary or not?" If the point of perforation is immediately found it should be closed by sutures. A long search for the same necessitates an excessive handling of the intestine, and usually results in causing additional trouble. Healing can take place without intestinal sutures. The most practicable method is to pack the incision with tampons of iodoform gauze, a few loose sutures being introduced to prevent any prolapse of the intestine. Great stress is laid upon the after-treatment; opium, strict diet, moist and warm abdominal compresses form a part. If symptoms of ileus continue without their being caused by any existing peritonitis, one should not hesitate to make an artificial anus.

In the debate which followed the reading of Mikuliez's paper, the subject of traumatic peritonitis was also brought forward, but it is not necessary that we should go into this province. We should, however, not forget to tell our American colleagues that the surgeon—König, of Göttingen—spoke of the far greater number of observations which have been made in America on this subject, as well as the vast experience gained there.

We could go on and point out numerous other subjects of discussion and debate which all tended towards the same end, as mentioned in the first part of this letter,—viz., to endeavor to increase the proximity of medicine and surgery. The surgeon Lanenstein lectured to the Congress for Internal Medicine on the subject of stenosis of the pylorus, and caused a lively discussion regarding the internal and operative methods of treatment which the clinician Leyden set forth, and which were highly interesting, especially in reference to his new treatment of contraction of the pylorus. Dr. Mosler, physician of internal medicine, related to the Surgical Congress his experiences with myxœdema, an affection which solicited the greatest interest of the surgeons for the reason that the symptoms of this disease are almost identical with those that have been observed to follow total extirpation of the larynx. The proximity of surgeon and physician in the province of pathology of the brain was clearly demonstrated by Horsley, the English physician, in his address to the Society of German Surgeons.

In short, this endeavor was woven through the entire proceedings of both great Congresses like a red thread, which was caught up at various points, and made secure by research and investigation. The fact opens a new era in the science of medicine and surgery, and may safely prophesy a future of new and efficient therapeutic methods.

IODISM AND SYPHILIS.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—There is one point in regard to the toleration of the iodides which has not been mentioned in the very interesting discussion upon the question whether a tolerance of iodide is an indication of syphilis. Although Stillé and Maisch, Farquharson, and possibly other writers on therapeutics mention it. I think that many physicians are not aware of the fact that iodism is much more likely to be produced by small doses of the drug than by large. This fact was impressed upon me several years ago, when I had an opportunity to watch the case of a young girl with some obscure cerebral trouble, for which iodide of potassium was thought advisable, although there was no syphilitic history attainable. 10 grains was given three times a day, but it was not borne; the dose was reduced to 5 grains, then to 3, and finally to 1 or 2 grains, but the intolerance persisted. At last she came under the care of another physician, who gave her 30 grains three times a day, which was tolerated perfectly, and from that point the dose was increased without further trouble. During my term of service as physician to out-patients with diseases of the nervous system at the Boston City Hospital, I see three to four hundred patients annually. Taking counsel from this case, for the last four years, when I wished to give iodide in full doses, I have begun with doses of 30 grains, pushing it, of course, to 60, 90, or even 150 grains three times a day. I cannot say in how many cases I have prescribed it, but the cases must be numerous; there have been cases of cerebral and spinal disease, and obscure nervous affections, in some of which there was a clear history of syphilis, and in others no such history could be obtained. The cases must number over a hundred, and in only four or five has

the patient reported any symptoms of iodism. Other patients may have had iodism and never returned to the hospital. One of the cases in which iodism occurred was in private practice,—a man with well-marked tabes dorsalis, who, about a year before his tabes began had a sore, followed by a purplish eruption and sore throat. 30 grains of iodide in this case produced iodism, but the iodide was pushed, and he has since taken 60 grains without coryza or eruption, although his stomach will not tolerate the drug for more than a few weeks at a time.

In hospital patients we are seldom able to exclude syphilis, but I know that I give iodide very often in doses of 30 grains and over, and that the percentage of patients who suffer from iodism is very small. This result may be explained by saying that all the cases which do not suffer are syphilitic, but the percentage is too large, and the statement would have to rest on mere assumption, for no such history can be obtained. Moreover, if all cases tolerating large doses of iodide are syphilitic, how can we explain the intolerance of small doses and the tolerance of large ones by the same patient. The question is hardly capable of mathematical proof, but my own experience has not led me to believe that tolerance of large doses of iodide is an indication of syphilis, and I do believe that iodism rarely follows large doses of the drug, if the initial dose is 30 grains or more.

Yours very truly,

PHILIP COOMBS KNAPP, M.D.

BOSTON, May 10, 1889,
33 MARLBOROUGH STREET.

POISONING WITH CALLA LILY.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—On the 26th I was called at 3.30 P.M. to see the child of J. C., aged 32 months. The history of the case is as follows: Previous to 1 P.M., same day, the child was perfectly healthy. About that time the mother observed the child, walking along the sidewalk in front of the house, chewing the stem of a Calla lily, which one of the neighbors had thrown out. She took it away, and, after giving the child a piece of pie, put it to bed; the child slept until three o'clock, when it woke up with rigors, vomiting, paleness, and subsequently lividity of countenance, convulsive movements, and failure of the circulation. By active stimulation, digitalis, atropine, etc., it recovered. This was followed by high fever. The first evacuations of the bowels were normal, but were followed by slimy, tarry evacuations, foul smelling. At this date child still very weak and in critical condition. On the 29th the hips and lower limbs were covered with a papular, dusky, and apparently hemorrhagic eruption. This was ascribed to contact with bowel discharges.

Now, what I wish to know is this, Is the Calla lily a poison? If not, to what are these violent and sudden symptoms to be ascribed? My diagnosis was poisoning by the Calla lily. Some of the local medical "Dogberrys" have been inclined to sneer at it.

Very truly yours,

F. C. CLUXTON, M.D.

BRADFORD, MCKEAN CO., PA.

[The editors of the THERAPEUTIC GAZETTE are not aware of any recorded case of poisoning by the so-called Calla lily; on the other hand, the plant belongs to the family Araceæ, many species of which contain acrid poisonous juices, and it is, therefore, very probable that the plant is poisonous. The symptoms detailed by Dr. Cluxton are quite extraordinary, especially in the occurrence of the hemorrhagic eruption, and give the case the aspect of having been produced by some food or other organic substance which had undergone partial decomposition, with the formation of ptomaïnes or allied principles.—EDS. THERAPEUTIC GAZETTE.]

HEMORRHAGE FROM SALICYLIC ACID.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—In the March number of the GAZETTE I find an article upon "Hemorrhage from Salicylic Acid," with a request for notes of similar experiences.

The treatment of acute articular rheumatism by the use of salicylate of sodium, when occurring in robust patients, has given such uniformly good results in this hospital that it has come to be almost a routine.

The drug is usually exhibited in doses of gr. x every hour until the temperature falls and the joint symptoms begin to show marked improvement, or until some of the physiological symptoms appear. In a few cases it has been given in doses of gr. xx every hour for a period of ten hours. The gr. x doses are often continued for three days, day and night, without producing deafness or tinnitus aurium.

From a hasty glance over our histories I

should say that at least thirty per cent. of all such cases have epistaxis on the second or third day. This has never been severe except in one case, and the dosage is immediately reduced on its occurrence. In no case, except the one noted above, has the tinnitus, or any other toxic symptom, preceded the epistaxis. Epistaxis is the only form of hemorrhage that has been noted.

The one exception noted was H. S., a German, æt. 23. His joint symptoms were not particularly severe, and his constitution was not as robust as usual in those cases treated with the salicylates. The dosage was gr. x each hour for eighteen hours. At about the twelfth hour he had a slight epistaxis, which he did not report to the nurse in charge. Just before the last dose he complained that his ears were ringing. Shortly afterwards he had a furious attack of epistaxis and became violently delirious. His pulse was irregular and slow, but temperature was 103. His delirium was of the melancholic type. Hemorrhage was so severe that plugging of the nares was necessary. Delirium continued all night. Profuse perspiration over the whole body. Repeated fresh attacks of epistaxis, and continued high temperature for twenty-four hours. Patient was somewhat prostrated, but ultimately made a good recovery.

Our dosage may be more heroic than is usually attempted, but certain it is that the results are very satisfactory. The majority of severe cases, if of not more than two weeks' standing when admitted, show total disappearance of joint symptoms within a week.

HERBERT W. CARDWELL,
Senior Interne.
METHODIST EPISCOPAL HOSPITAL,
BROOKLYN, N. Y., May 19, 1889.

TREATMENT OF YELLOW FEVER.

To the Editors of the THERAPEUTIC GAZETTE:

DEAR SIRS:—Dr. Sternberg, in his paper, published in the May number of your journal, on the "Treatment of Yellow Fever," on page 301, mentions Dr. Cleary, of Rio de Janeiro (*whose first name is not Robert, as printed, but* REUBEN), as having adopted his method. As I have a letter from Dr. Reuben Cleary, dated Rio de Janeiro, April 1, 1889, relating to yellow fever there in general, and Dr. Sternberg's treatment in particular, I have copied a few extracts from the same which I inclose for publication, if deemed of sufficient interest to your readers by you.

With great respect, yours,
J. T. HOWARD.

WASHINGTON, D.C., May 25, 1889,
No. 1126 NINTH STREET N. W.

RIO DE JANEIRO, BRAZIL, S. A.,
April 1, 1889.

". . . We have passed (and are still passing) through one of the most horrible seasons which ever afflicted Rio; the death-rate reached one hundred and sixty-seven in one day, while the normal number averaged some twenty-eight to thirty. As many as fifty-one fell dead in the streets, or died in a few hours after falling, in one day. The funerals were passing my door *at a gallop* all day long and until one or two o'clock in the morning, and workmen to prepare coffins could not be found in sufficient numbers, nor even men to carry them to the houses of the dead. The authorities seemed to be paralyzed, and in my opinion are directly responsible for this state of things, because of the excessive and long-continued heat, and absolute want of rain, the water-supply was insufficient, so much so that in many streets not one drop was to be had except that brought from the suburbs in carts. Rev. Mr. Jarloux told me he had spent seventy-five cents one day buying water. *After* the rains commenced, on the 21st of March, the authorities had an immense supply of water introduced in six days from the mountain-streams near town (which all the time could have supplied a sufficiency), instead of doing so at the beginning of the season, since when the heat is not so great and the death-rate is reduced one-half; still it is fearfully high. There were many cases of 'heat excess,' and just such yellow fever as they had in Memphis once, killing in a few hours, which appeared not to be well understood here; they called it *accesso perniciosi* (pernicious attack).

"Besides other malignant diseases, I have had thirty-four cases of yellow fever (genuine), of which thirty-three are up and walking about; one poor girl died. . . . There was no water to wash out the public drains, which were foul and stinking; . . . and when the rain came and flooded them, the outpouring blackened the water of the bay for miles. . . . When I had the yellow fever last year, in spite of the wishes of my attending physicians, I took large doses of bicarbonate of sodium as against the excessive acidity, which was caus-

ing vomits and killing me, they saying that acid kills the microbe. Now, Dr. Sternberg's experiments prove that in yellow fever the whole alimentary canal is filled with highly acid matters, hence he recommends alkalies as a germicide. I always use his formula (modified), as my experience proves that alkalies help to preserve the flow of urine, lessens the albumen, and calms the stomach, though I do not neglect my regular treatment. His (Dr. Sternberg's) formula, modified, is:

℞ Bichlor. hydrarg., .03;
Bicarb. sodii, 10;
Aq. pura, 1000. M.

Sig.—Dose, 2 large tablespoonfuls every hour *ice-cold*.

"Many of my sick had black vomit, all albuminous urine with slight suspension, and some were in a state of collapse, so that I filled them with brandy and gave hypodermic injections of ether. For suppression of the urine I have used hypodermic injections of caffeine at intervals of one hour, and every time succeeded in re-establishing the flow in four hours."

TREATMENT OF PHTHISIS.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—I noticed in the April number of the THERAPEUTIC GAZETTE that Miguel and Rueff have used inhalations of mercury in the *treatment* of *phthisis* with good results. I also have used mercury by inhalation in the *treatment* of *phthisis* during the past two years, with good results. I have reported several cures to the medical society, and intended to have it reported by a journal, but waited to see how long my cases remained well.

So far the treatment has been successful. One case has been under my observation for two years without any return of the symptoms. I would like you to give my treatment a small space in your valuable journal.

The best hygienic soundings that can be had will aid very materially in recovery. It is hardly necessary to say anything about nourishment, as so much has already been written on that subject.

I give the following prescriptions:

℞ Hydrarg. bichl. corros., gr. i;
Sat. sol. of acid boracis, ℥vi. M.

Sig.—To be used three times per day in steam-atomizer for five minutes.

℞ Chloral hydrate, ʒiv;
Div. in chart. No. 2.

Sig.—Dissolve one powder in glass of water and add ℥i of alcohol. Sponge patients twice a day.

Under this treatment the night-sweats stop, the temperature becomes normal, chills stop, and the patient gains weight. After the patient is able to get around and the temperature becomes normal, stop the sponging, and use the inhalation twice daily.

In closing, Mr. Editor, I hope many who read your valuable journal will give this treatment a fair trial and report.

I remain, yours respectfully,

O. H. PRESBY.

1360 LEXINGTON AVENUE, NEW YORK,
May 6, 1889.

HYPODERMIC INJECTION OF LACTATE OF QUININE.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—In the April number of the THERAPEUTIC GAZETTE is an article on the hypodermic employment of lactate of quinine, and directions are given for the preparation of the salt and its solution.

The following formula gives, practically, the same results, minus the bother of precipitating the quinine, etc.:

℞ Quininæ sulph., gr. xx;
Ac. lactis, ♏xx;
Aquæ dest., q.s. ad m. c. M.
Sig.—♏v = gr. i quininæ.

This I have used a number of times, giving ♏xx at a puncture, and have never had any unpleasant local effects, except only in one instance, and then only a slight tenderness for a day or two. For the convenience of both doctor and druggist, the above formula is worth remembering.

Yours, etc.,

CHARLES M. SELTZER.

PHILADELPHIA, May 30, 1889,
608 NORTH SEVENTEENTH STREET.

THE DOSE OF GELSEMIUM SEMPERVIRENS.

To the Editors of the THERAPEUTIC GAZETTE:

GENTLEMEN:—In the THERAPEUTIC GAZETTE for November 15, 1888, a writer speaks of giving "one good large dose of the fluid extract of gelsemium, say 15 to 25 minims," for acute nasal catarrh. From my experience with this drug I should consider the dose an unsafe one. I have seen one patient in whom 5-drop doses of a fluid extract of gelsemium produced alarming toxic symptoms (*Phila. Med. Times*, January 5, 1878). The patient had been

taking the remedy for about two weeks,—5 drops three times a day,—and had taken in all one fluidrachm of the fluid extract. In another case, a dose of 7 drops caused visual disturbance and unsteadiness of gait. I should be glad to have your opinion as to the proper dose of the preparation.

Yours, etc.,

WHARTON SINKLER.

PHILADELPHIA, May 26, 1889,
1534 PINE STREET.

[15 minims of fluid extract of gelsemium is certainly an unsafe dose for ordinary use.—EDS. THERAPEUTIC GAZETTE.]

Notes and Queries.

TUBERCULOSIS OF THE PERITONEUM.

From material consisting of twenty-five fatal cases of tubercle in which the peritoneum was either primarily affected, or in which it had been affected for a long period, DR. HEINTZE deduces some interesting facts, which he publishes in the form of an inaugural dissertation. All the cases occurred in the Breslau clinic, and necropsies were made in every instance, so that there was no doubt about the diagnosis. He divides the cases into three groups. 1. Those where there was a copious fluid effusion. Here the clinical symptoms bore considerable resemblance to those met with in cases of ascites from congestion. From this condition they were distinguishable by the very large amount of albumen contained in the fluid drawn off on tapping. No tubercle-bacilli, however, seem to have been found. After the distention had been relieved by the removal of the fluid, the thickened peritoneum could frequently be felt, and peritoneal friction could be detected. These effusion cases formed the most numerous of the three groups. 2. The plastic form, producing a coating or tumor-like bodies. The pseudo-tumors formed by the exuded plastic matter could generally be distinguished from real tumors by the ill-defined character of their edges. This group comprised nine of the twenty-five cases, and in five of them there were tumors of considerable size. In these plastic inflammations there is generally a good deal more pain than when there is much fluid effusion; there is a tendency, too, to the formation of kinks in the gut and bands, which cause obstruction, so that fæcal accumulations and ileus are not uncommon. 3. The latent form, where there is neither any great amount of effusion nor much plastic exudation. These are the cases which used to be classed as tuberculosis of the peritoneum, in contradistinction to those in which the inflammatory symptoms were more prominent, which were denominated tubercular peritonitis,—a distinction which Dr. Heintze thinks is unsatisfactory. One remarkable point is mentioned in the dissertation,—viz., the frequency with which tubercular disease of the peritoneum is associated with cirrhosis of the liver. This was found in seven of the twenty-five cases. Pleurisy was found twenty times, and signs of scurvy twice. In many cases there were long remissions, so the prognosis is not necessarily quite so grave as it is usually supposed to be. The patients died mostly from general tuberculosis, very rarely from perforating peritonitis or from tubercular peritonitis. Most of the cases occurred in the male sex, frequently among men addicted to drink. In three instances an injury to the abdomen had preceded the commencement of the symptoms. As to operative measures, the only good that can usually be done is to empty the peritoneal cavity, so as to free the vessels from the pressure of the ascitic fluid; paracentesis only accomplishes this imperfectly. In the plastic form, operative measures are, as a rule, useless, it being impossible to remove all the diseased matter as can be done in tubercular disease of bones or joints; still there are circumstances under which an operation may be imperatively called for, as, for example, where ileus is produced by the formation of constricting bands. Dr. Heintze does not think any advantage is to be expected from opening the abdomen and dusting the viscera with iodoform.—*Lancet*, April 6, 1889.

THE IDENTIFICATION OF CERTAIN NEW REMEDIES.

The new remedies antipyrin, antifebrin, phenacetin, salol, sulphonal, and urethan, when compressed into tabloids, cannot, on account of their similarity of form and color, easily be distinguished from one another by simple inspection. The following test, proposed by A. PERCY SMITH in the *Pharmaceutical Record* for April 1, 1889, will, however, be found sufficient for identification of the drug, should the label on the bottle by any accident be defaced or removed:

	One 5-gr. tabloid + 3i HNO_3.		Diluted with ℥ss water.
	Cold.	Hot.	
Antipyrin	Liquid turns yellowish.	Violent action; tabloid turns deep red and dissolves to red liquid.	Turbid purple liquid; deposits on standing.
Antifebrin	Nil.	Violent action; liquid turns orange.	Yellow-orange solution, growing turbid as it cools.
Phenacetin	Tabloid and liquid both turn yellow.	Violent action; yellow liquid; on cooling becomes solid by separation of crystals of trinitrophenol.	Partial solution of crystals.
Salol	Very faint violet tint; tabloid melts on slightly warming.	Strong action; orange liquid; crystals separate on cooling and float to surface.	Pale yellow liquid; white floating crystalline mass.
Sulphonal	Liquid slightly yellow.	Tabloid dissolves to a clear yellow solution.	Colorless; deposits white crystals on standing.
Urethan	Dissolves easily.	No change.	No change.
Sulphonal, Phenacetin	+ a drop of solution of ferric salt.		= slight stain.
Antipyrin	+ a drop of solution of ferric salt.		= deep blood-red color.

DEPARTMENT OF THE INTERIOR,
CENSUS OFFICE,
WASHINGTON, D. C., May 1, 1889.

TO THE MEDICAL PROFESSION:

The various medical associations and the medical profession will be glad to learn that DR. JOHN S. BILLINGS, Surgeon United States Army, has consented to take charge of the Report on the Mortality and Vital Statistics of the United States as returned by the Eleventh Census.

As the United States has no system of registration of vital statistics, such as is relied upon by other civilized nations for the purpose of ascertaining the actual movement of population, our census affords the only opportunity of obtaining near an approximate estimate of the birth- and death-rates of much the larger part of the country, which is entirely unprovided with any satisfactory system of State and municipal registration.

In view of this, the Census Office, during the month of May this year, will issue to the medical profession throughout the country "Physician's Registers" for the purpose of obtaining more accurate returns of deaths than it is possible for the enumerators to make. It is earnestly hoped that physicians in every part of the country will co-operate with the Census Office in this important work. The record should be kept from June 1, 1889, to May 31, 1890. Nearly 26,000 of these registration books were filled up and returned to the office in 1880, and nearly all of them used for statistical purposes. It is hoped that double that number will be obtained for the Eleventh Census.

Physicians not receiving Registers can obtain them by sending their names and addresses to the Census Office, and, with the Register, an official envelope which requires no stamp will be provided for their return to Washington.

If all medical and surgical practitioners throughout the country will lend their aid, the mortality and vital statistics of the Eleventh Census will be more comprehensive and complete than they have ever been. Every physician should take a personal pride in having this report as full and accurate as it is possible to make it.

It is hereby promised that all information obtained through this source shall be held strictly confidential.

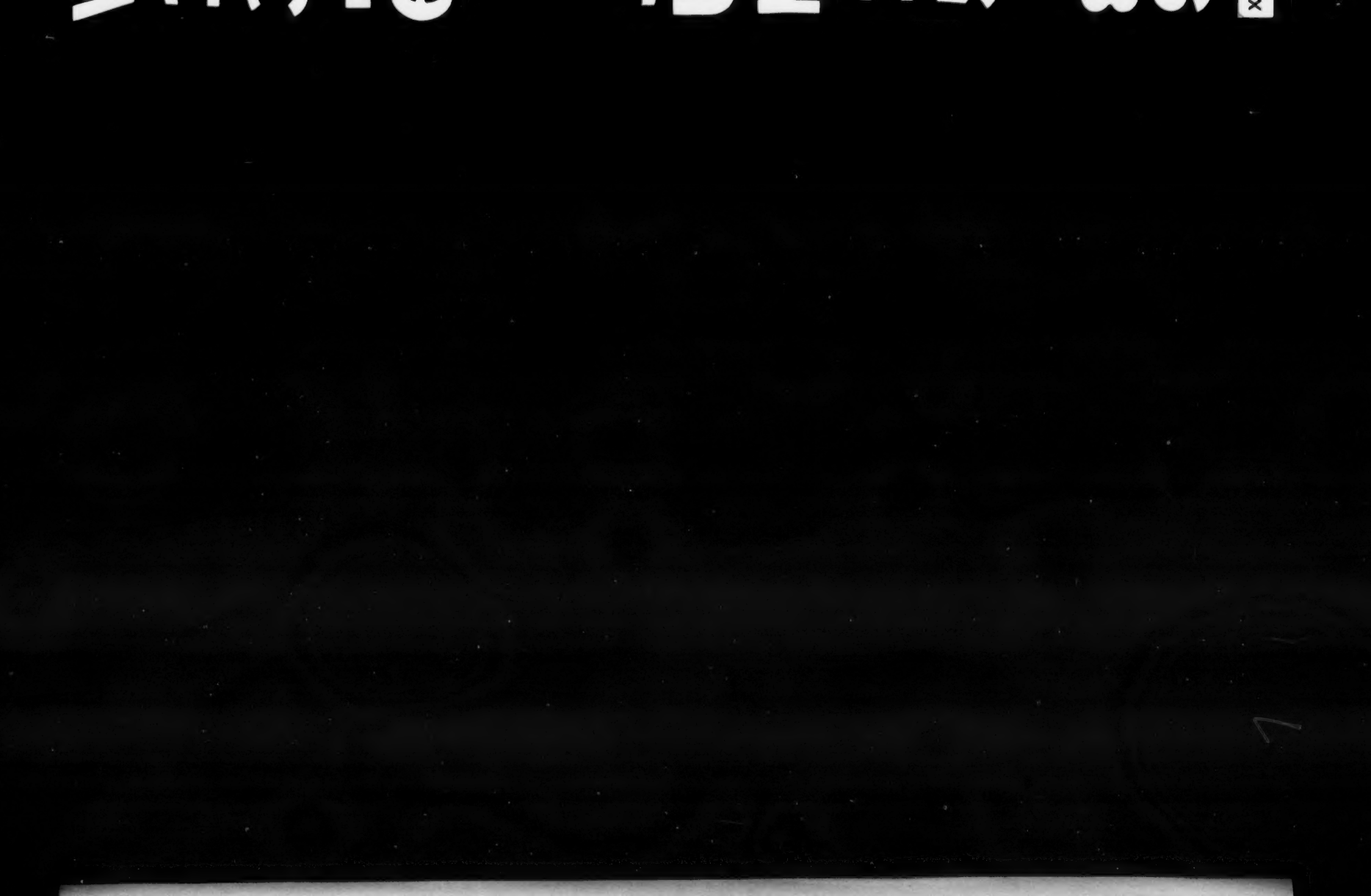
ROBERT P. PORTER,
Superintendent of Census.

"PROCURSIVE" EPILEPSY.

This term is in far more common use among the French than with us. It signifies an attack the chief feature of which is a propulsion of the body in some special direction; it is apparently not accompanied by actual loss of consciousness, or followed by coma; its duration does not exceed that of an ordinary epileptic fit; according to Bourneville and Bricon, it is attended with marked congestion of the face. These cases are known to be epileptic by their associations as well as by the character of the attacks, the element of suddenness being very marked. In the same individual they may be replaced by epileptic fits, or they may replace a true epilepsy with loss of consciousness. There is, indeed, nothing so very remarkable in their occurrence if they be regarded from a physiological stand-point. They are the equivalents of head-banging and head-shaking in infants and children. The actual kind of movement varies much in different cases,—in some a rapid revolving of the body around its horizontal axis, in others a rotation in a large circle, and in others a movement recalling that performed by some clowns. The highest expression of consciousness—if this be perfect control over volitional efforts—is evidently lost, since the patient cannot prevent himself from performing these absurd antics.—*Lancet*, May 11, 1889.

THE TREATMENT OF ANEURISM.

Dr. Aurelio Mutis, of Bogotá, publishes, in the *Revista Mèdica* of that city, an account of a case of abdominal aneurism occurring in a patient of 37 years of age, which he successfully treated according to the method adopted by Huchard in Paris and by Balfour and Duckworth in this country,—viz., complete rest in the recumbent posture, combined with large and long-continued doses of iodide of potassium or sodium. The treatment was commenced on June 1, 1887, the daily quantity of iodide of potassium ordered being sixty grains. A soap-and-water enema was given every morning, and no sitting up permitted. Liquid food also was prohibited as far as possible. Within two months the cough, which had been the most distressing symptom, entirely disappeared; at the end of three months the pain had also vanished, and the tumor, which had formerly existed at a spot a hand's breadth below the xiphoid cartilage, and which had been as large as an orange and markedly pulsatile, had very perceptibly diminished in size, the pulsations also had decreased in amplitude. The iodide of sodium was now substituted for that of potassium. At the end of six months, the tumor and all the symptoms due to it having entirely disappeared, the patient was allowed to get up and to move cautiously about the room. In a short time he was able to go out, and during all last year he carried on his business as usual, and has remained quite free from all symptoms of the disease up to the present time.—*Lancet*, May 18, 1889.

CINCHONIDINE AND EPILEPSY.

It has been known for a long time that cinchonidine, one of the alkaloids of the cinchona bark, possesses the power of producing epileptic convulsions. Professor Chirore, in Padua, assumes, from his experiments made on pigeons, in which this alkaloid was incapable of producing convulsions after ablation of the cerebral hemispheres, that cinchonidine owes this property to its action on the motor cerebral zone. Albertoni, on the other hand, notes that in pigeons, as well as in dogs, even after ablation of the corresponding motor zones, cinchonidine still was capable of producing convulsions, and from the results of his experiments he concluded that epilepsy has its starting-point not in the cortex, but in the mid-brain and medulla oblongata. In this state of the question, Drs. Lussana and Gallerani reported a number of further experiments which they had made before the Societa Medico-Chirurgica in Bologna (*Internationale Klinische Rundschau*, May 12, 1889). They found that after extirpation of the motor zones in no case was injection of this alkaloid capable of immediately producing epileptic convulsions, but that the convulsions occurred a short time after the operation, when the irritative influence of the operation had passed off. The authors, therefore, believe, from their results, that they can confirm the conclusions of Albertoni that, in addition to the cerebral cortex, epileptic convulsions may have their starting-point both in the mesencephalon and medulla oblongata.